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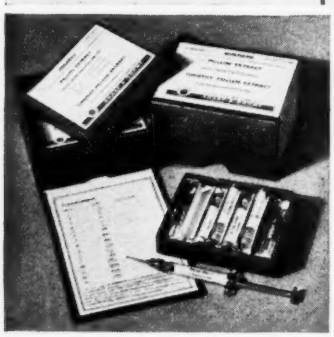

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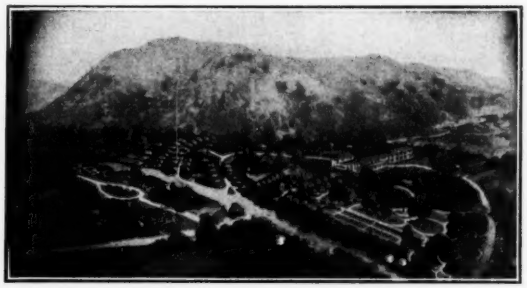

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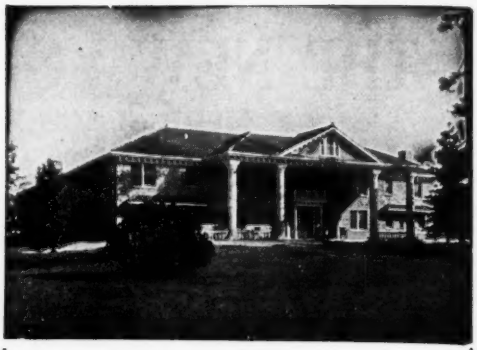

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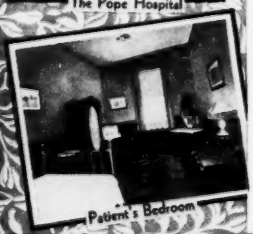
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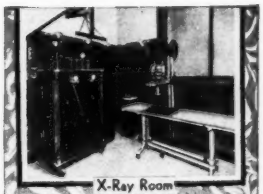
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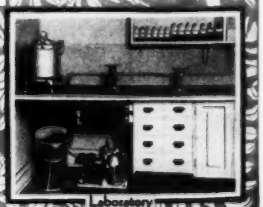
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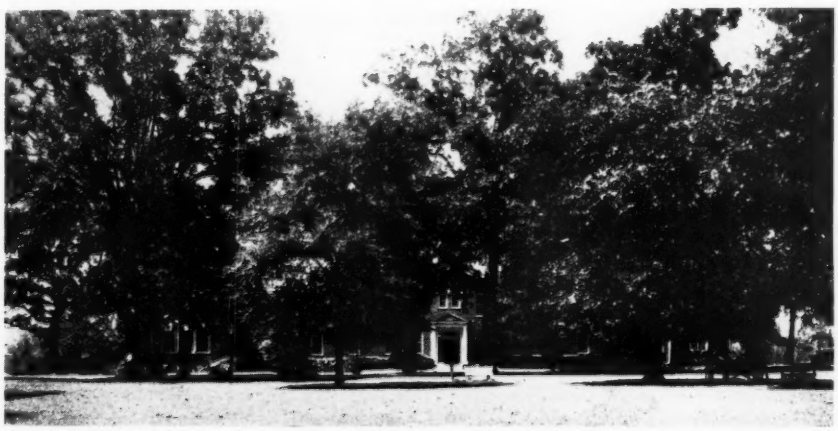

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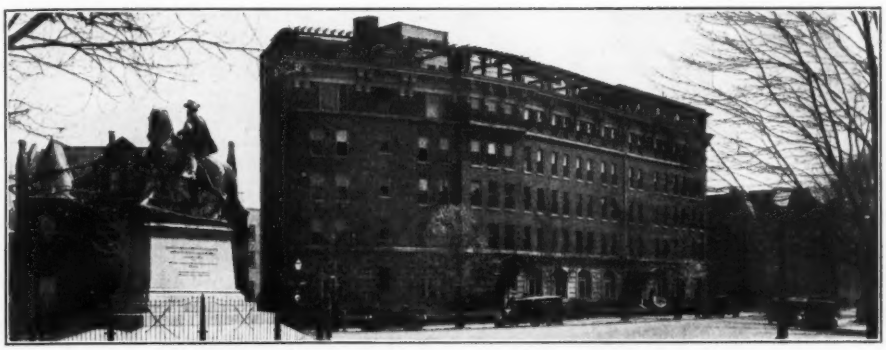

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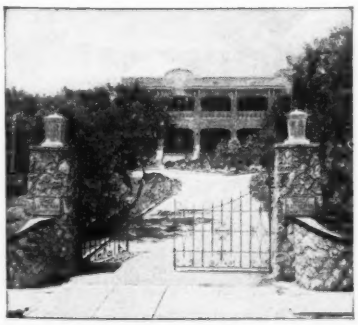

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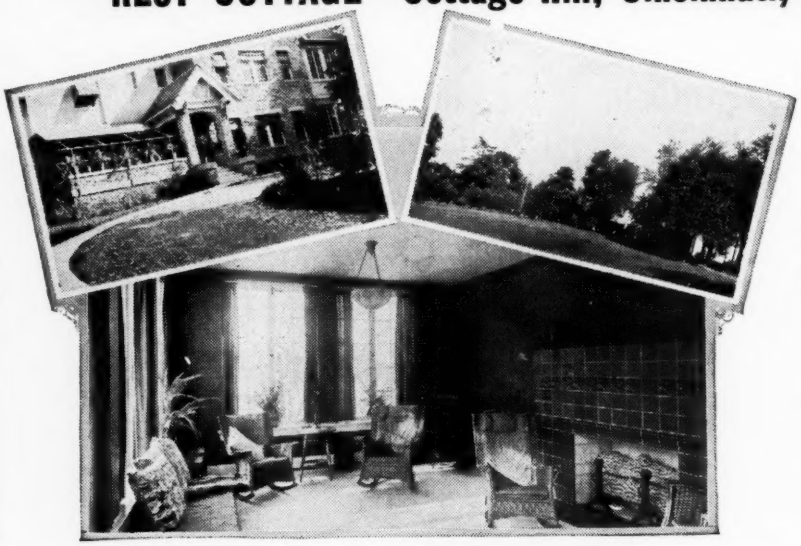

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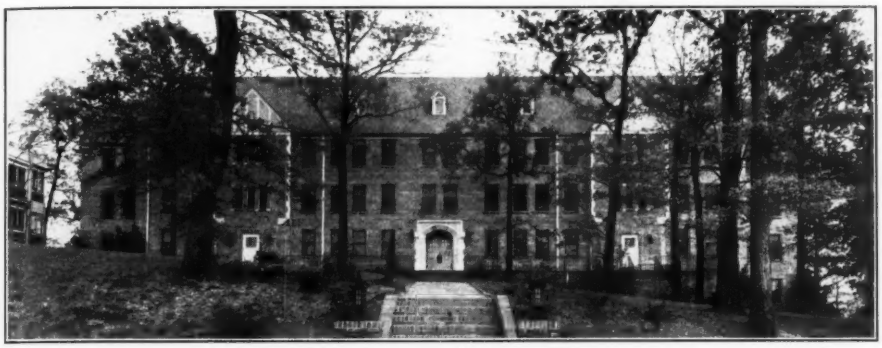

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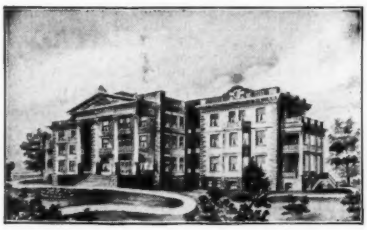

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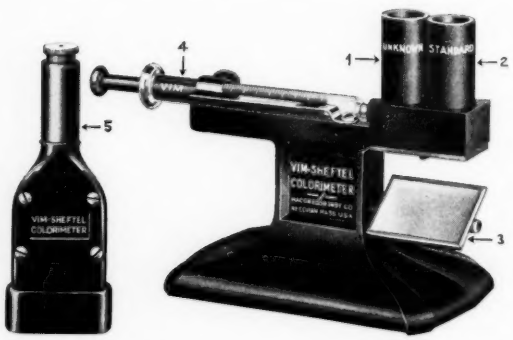

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ROENTGENOLOGIC EXAMINATION OF INJURIES OF THE WRIST JOINT*

By VINCENT W. ARCHER, M.D.,
and
BENJAMIN W. RAWLES, JR., M.D.,
University, Va.

The medical practitioner untrained in roentgenology usually regards an x-ray examination of the wrist as very simple and very easy to interpret. Radiologists see as high a percentage of error in the diagnoses of injuries around the wrist in patients who have been "x-rayed" by casual radiologists as they see in any other portion of the body. This brings to mind the maxim, "There is no simple roentgen examination."

For the purpose of discussion, injuries of the wrist may be divided into six groups: (1) epiphyseal injuries; (2) fractures of the radius and ulna, or both; (3) gross fractures of the carpals; (4) "sprain" fractures; (5) dislocations; (6) Kienboch's disease. The responsibility of the radiologist to the referring physician and to the patient will be discussed in connection with each of these divisions.

Epiphyseal Injuries.—During the epiphyseal age, an injury to the epiphysis is not uncommon, since the thin layer of cartilage joining the epiphysis to the shaft is one of the weakest points of the long bones. Gross epiphyseal separations are readily recognized in the roentgenogram. Certain other injuries are difficult or impossible to diagnose radiologically. If an epiphyseal separation has been perfectly reduced, and there has been no associated chipping or fracture of the shaft, the presence of injury cannot be diagnosed by the x-ray. In this type of injury it is, therefore, proper to insert the phrase, "this does not eliminate the possibility of epiphyseal separation with reduction," in an otherwise negative report. The patient should be treated on the basis of clinical observation rather than on the x-ray appearance.

Fractures of the Radius or Ulna, or Both.—Fractures of the radius and ulna usually offer little difficulty as to diagnosis. The greatest responsibility of the radiologist is in the interpretation of the post-reduction films. In the normal wrist there are two articular planes, well described by Skinner and others, which are of great importance. These are shown in the diagram taken from Skinner's paper. There is a plane extending from the styloid of the radius to the styloid of the ulna. This runs obliquely towards the ulna, the styloid of the radius extending considerably more distally than the ulna. The second plane is the joint between the lower end of the radius and the proximal row of carpals. This is seen in the lateral view and is again oblique, the palmar aspect being slightly proximal to the dorsal aspect. To secure good functional results in fractures of the lower forearm, it is essential that these planes be restored to as nearly normal obliquity as is possible. Alignment may be almost perfect, and yet a fault in one of these articular angles may give a very poor functional result. It is the duty of the radiologist to interpret variations in these joint planes.

There is one type of radial fracture which may offer difficulties in interpretation. Occasionally there may be an incomplete fracture through the region of the partially fused epiphysis, and, unless care is exercised, this may erroneously be interpreted as an epiphyseal line. Films of the opposite wrist for comparison are invaluable in cases of this character.

The radiologist may be of considerable aid to the referring physician in cases showing fractures involving the joint. In this type of fracture, with articular surface involvement, prognosis as to the return of normal function should be guarded. If the patient is informed of this

*Read in Section on Radiology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

*From the Department of Roentgenology, University of Virginia Hospital, University, Virginia.

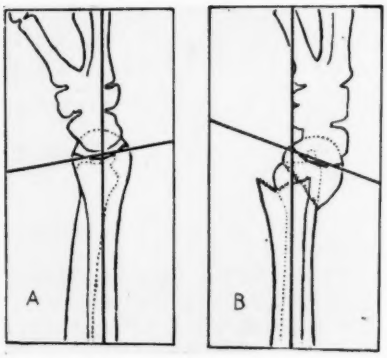

Fig. 1

A, plotting of the angle of the joint surface of the lower end of the radius on the lateral roentgenogram of the normal wrist; B, angle assumed by the plane of the lower joint surface when the lower end of the radius suffers a compression fracture; the reduction should attempt to restore this joint plane to that shown in A. (After Skinner.)

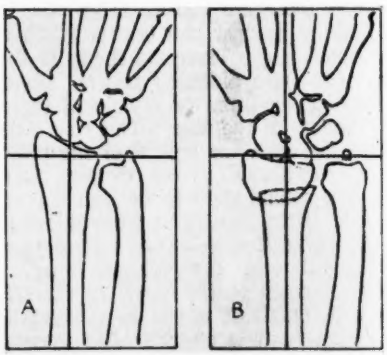

Fig. 2

A, normal plotting at the wrist in the dorsopalmar roentgenogram; the cross line at the level of the ulnar styloid shows the radial styloid distal to this line; B, with the compression (Colles) fracture of the lower end of the radius with the usual displacement backward and upward of the lower fragment, the radial styloid occupies a position proximal to this transverse line at the level of the ulnar styloid; the functional result is better if the restoration of fragments secures the plotting as shown in A. (After Skinner.)

at the time of the first examination, there is much less liability of complaint should impaired function be the result.

Fractures of the Carpals.—In contradistinction to the ease of diagnosis of fractures of the radius and ulna, diagnosis of fractures of the carpals stands out in sharp contrast. The reason for this is obvious when one remembers the complex joint arrangement, the many facets, and the various angles of these bones in relation to each other. Fractures of the carpals are not rare, scaphoid and semilunar involvement bearing a ratio of one in ten to Colles', according to Scudder, and yet far too many men examining films of the wrist are content when the radius and ulna are seen to be intact. In our clinic, we see more fractures of the carpals which have been undiagnosed by other men than is true of any other bones of the body. This holds true in cases which have had x-ray examination elsewhere, as well as in those cases in which a diagnosis of "sprained wrist" was made without x-ray examination.

Some years back it was our custom to make only the two standard films, one in the dorsopalmar position and one in the lateral position. Several cases with clinical fractures which were not clearly visible in these two positions, but which were clearly demonstrated in the oblique views, led us to adopt a routine of at least four different positions in any suspected carpal injury (*Figs. 3* and *4*). These two additional positions are semipronation and semisupination, so called by McBride. Semipronation gives a clear outline of the trapezium, the trapezoid, and an oblique view of the scaphoid. Semisupination clearly reveals the pisiform and cuneiform. Many times films made of the opposite wrist at the same angles are valuable for comparison. Since the adoption of the above routine we have discovered fractures which were

Fig. 3

Standard antero-posterior and lateral positions which do not demonstrate fracture.

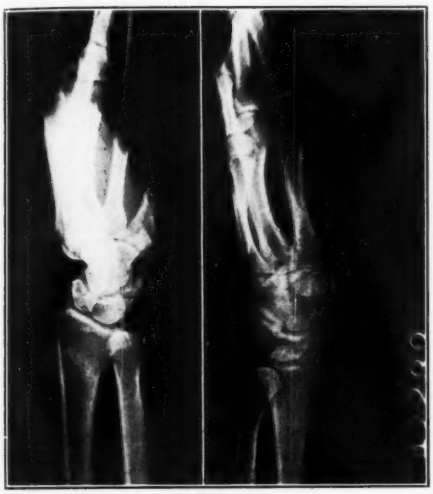

Fig. 4
Same case as Fig. 3, showing views in semipronation and semisupination clearly demonstrating fracture of the cuneiform.

absolutely invisible on films made in the standard positions.

Accurate localization of the point of suspected injury should be made by the referring physician and checked by the radiologist.

Treatment of fractures of the carpals differs radically from treatment of fractures of the radius and ulna. Union in carpal fractures progresses much more slowly than in fractures of the long bones, and it is usually necessary to immobilize for a period of eight to ten weeks. The slow union is due in the main to a very scant blood supply and the small amount of periosteum. Early complete immobilization is of the utmost importance, even in the very fine linear fractures. This was beautifully demonstrated in a case occurring in our clinic.

A student who had an injury to the wrist was examined radiologically and a very fine linear fracture was seen running through the scaphoid. On account of the minute fracture line, a reexamination in the oblique position was made, which again demonstrated the same fine line. The student was told that immobilization for eight weeks was necessary. He conceived the idea that, since a reexamination was necessary, there was some doubt as to the presence of a fracture and refused treatment. Ten months later he again consulted us. At this time films showed complete absorption along the fracture line, with a separation of the fragments. Strangely enough, even after this period of time, union was secured by immobilization for ten weeks.

A detailed discussion of treatment is not within the province of this communication, but since the radiologist is, or should be, a consultant, certain principles of treatment must be emphasized. By far the majority of fractures are handled by men doing general practice and the radiologist can be of much assistance to these men by giving helpful hints as to treatment. The radiologist sees many more fractures than any one man who is referring him work, and consequently should have a better knowledge of both pathology and bone repair than any medical man, except the orthopedist.

Sprain Fractures.—In the wrist, as in any other joint, there may be separation of the ligament and its bony attachment from the body of the bone. To this type of injury the name "sprain fracture" has been applied. Injuries of this character in the wrist usually involve the carpals. The principles of treatment are in general the same as those applied to gross carpal fractures. It is this type of fracture which, when untreated, gives rise to the expression that "a bad sprain is worse than a fracture." Unless a careful roentgen examination is made, these will uniformly be classed as sprains, the small detached fragment of bone being overlooked. Based on our experience with many hundreds of athletes and their "sprains," which on examination proved to be "sprain fractures," we believe that in all cases where there has been an injury with sufficient force to have broken a bone, an x-ray examination should be made.

Dislocations.—Dislocations of the carpals occur quite frequently in conjunction with fractures of the other carpals. With fractures of the scaphoid, the semilunar is often dislocated. The four views described previously will show very nicely the articulations of the various bones. The lateral view is the most valuable in dislocations of the semilunar. Early diagnosis is of importance, since, if reduction is to be accomplished without open operation, the dislocation must be recognized before the former site of the bone has filled in with granulation tissue.

Kienboch's Disease.—Gross fractures of the semilunar are very rare, but there is a pathological fracture which is occasionally seen. This is the so-called Kienboch's disease, which to our minds bears a very close relationship to Legge-Perthes' disease, involving the epiphysis of the head of the femur; to Kohler's disease, involving the tarsal scaphoid; and to the other deforming bone diseases of adolescence. Patients will come in with a history of slight trauma to the wrist and will show on the x-ray films a peculiar compression type of bone deformity in the semilunar. On careful examination of the

films, the entire texture of the bone is found to be abnormal, being compressed and irregular as seen in all views. Operative removal, which apparently is the treatment of choice, shows an irregular area of bone. Microscopic examination shows only an inflammatory process. Bacteriological studies have been negative. It is important to recognize this condition and to differentiate it from a true fracture, for the treatment in the two is entirely different. Good results have been obtained in cases of Kienboch's disease in which the entire bone has been removed.

SUMMARY

The various injuries of the wrist joint and the responsibility of the radiologist in each type have been discussed.

(1) In suspected epiphyseal separation the patient should be treated on the basis of the clinical manifestations rather than on the x-ray appearance.

(2) In Colles' fractures, the importance of reestablishing the two joint planes has been stressed.

(3) In suspected carpal injury, the importance of two additional views made in semipronation and semisupination is emphasized. Accurate localization of the point of suspected injury should be made by the referring physician and checked by the radiologist.

(4) The necessity of careful examination of the carpals in four views in order to detect small detached fragments due to sprain fractures is stressed.

(5) The relationship of bone to bone should be noted to rule out dislocation, using the opposite wrist for comparison if necessary.

(6) Kienboch's disease should be strongly considered as a probability in any gross fracture of the semilunar.

(7) There is no simple x-ray examination.

BIBLIOGRAPHY

1. Adams, B. S.: Fractures of Bones of Hands and Fingers. Mian. Med., 12:515, Sept., 1929.
2. Bizarro, A. H.: Traumatology of the Carpus. Surg., Gyn. & Obst., 34:574, May, 1922.
3. Codman and Chase: Fractures of Carpal Scaphoid. Ann. Surg., 41:863, 1905.
4. Cronk, N. Y.: Injuries to Small Bones of Hands and Wrist. Jour. Okla. Med. Ass'n., 19:64, March, 1926.
5. Destot: Injuries of the Wrist. New York: Paul B. Hoeber, 1927.
6. Farr, C. E.: Dislocation of Semilunar. Ann. Surg., 84:112, 1926.
7. Kohler: Roentgenology. New York: William Wood & Co., 1929.
8. McBride, Earl: Wrist Joint Injuries: A Plea for Greater Accuracy in Treatment. Jour. Okla. Med. Ass'n., 19:67, March, 1926.
9. Phillips, Karl T.: A Fracture of the Carpal Cuneiform. New Eng. Jour. Med., 204:322, Feb. 12, 1931.
10. Rhinehart: Roentgenographic Technique. Philadelphia: Lea & Febiger, 1930.
11. Ritter, H. H.: Fractures of the Carpus. Surg., Gyn. & Obst., 49:838-842, Dec., 1929.
12. Scudder: The Treatment of Fractures. W. B. Saunders Co., 1926.
13. Skinner, Edward Holman: Roentgenographic Interpretation of Functional Reduction of Fractures. J.A.M.A., 92:693, March 2, 1929.
14. Slesinger, E. G.: Fractures at Wrist-Joint. Postgrad. Med. Jour., 4:114, April, 1929.
15. Speed: Traumatic Injuries of Wrist (quoted by Ritter).[11]
16. Speed, K.: Fractures of Wrist. Jour. Lancet, 47:265, June 15, 1927.
17. Stinson: Fractures and Dislocations. Philadelphia: Lea & Febiger, 3rd Edition.
18. Tibbetts, M. H.: Fractures of Wrist. Minn. Med., 12:521, Sept., 1929.

DISCUSSION (*Abstract*)

Dr. D. A. Rhinehart, Little Rock, Ark.—Dr. Archer's conclusions might be applied to injuries of any part of the body. The multiplicity of injuries that may occur in and around the wrist is rather poorly understood by the usual physician.

In my experience, the diagnosis of these injuries is usually one of two diagnoses: there is either a Colles' fracture or a sprain. These, of course, do not in any way cover all the types of injury that may occur.

The roentgenologist has a responsibility in instances of this kind, a responsibility in both diagnosis and treatment. Although he may never have actually treated an injury to the wrist, in a majority of instances he has examined the results of treatment of not one, but many surgeons, and he is therefore perhaps as well qualified as anyone to judge the results. If the roentgenologist is thorough in his examination, clever in his diagnosis and insists upon satisfactory treatment, the results in the treatment of injuries of the wrist will be considerably improved.

Dr. A. R. Shands, Jr., Durham, N. C.—Fractures of the scaphoid are more common than is generally thought. With the new technic of taking two additional views in semipronation and semisupination we should be able to pick up many fractures of the carpal bones which we have previously missed. Prolonged disability of the wrist should be explained in some other manner than simply by calling it a strain or sprain. These terms to explain away disabilities should either be dropped from our medical vocabulary or seldom used. I do not believe that we take x-rays often enough of the normal wrist for control. This should always be done when in doubt about a diagnosis. Fractures of the carpal bones require prolonged immobilization, for it takes much longer for new bone to form in the poorly vascularized cancellous bone of the carpus. The works of the Frenchman, Etienne Destot of Lyons, on "Injuries of the Wrist," is a classic. He has said: "The bones of the carpus are badly nourished by vessels whose support is found in the ligaments, and when these are broken, troubles of nutrition are easily produced and easy to understand." This statement can certainly explain why we have much prolonged pain in these fractures.

A lateral displacement of the radial epiphysis of slight degree very often follows a loosening of the epiphyseal line and is overlooked. Careful x-rays will often identify this condition. The so-called sprain fractures and fractures of the radius into the joint are most disabling injuries for which little can be done other than immobilization. A careful x-ray interpretation is most helpful in these types.

I have seen very few cases of Kienboch's disease. The strange thing about these conditions is that they never seem to follow fractures or dislocations of the semilunar bone. Whether trauma is an etiological factor or not has never been determined.

Dr. Franklin B. Bogart, Chattanooga, Tenn.—Dr. Archer and Dr. Rawles are to be commended for emphasizing the responsibility which we roentgenologists have as consultants. In injuries of this type physicians often feel that they do not need the interpretation of the film by a roentgenologist. As Dr. Archer has emphasized, there are no simple x-ray examinations. Physicians should seek the aid of the x-ray specialist in more cases and the roentgenologist should recognize the responsibility which his status as a consultant places on him.

While this paper was not intended to cover variations of the bones of the wrist, I would like to remind you that there are many such variations and that some of them may be easily mistaken for fractures. These variations furnish another illustration of the fact that detailed knowledge and experience with a large group of cases is of great value in the proper interpretation of an x-ray. The roentgenologist is best qualified to do this interpretation.

THE VALUE OF SERIAL ROENTGENOGRAPHY IN PULMONARY TUBERCULOSIS*

By P. F. Titterington, M.D.,
St. Louis, Mo.

To those interested in the study of pulmonary tuberculosis the title of this paper is self evident, but it might be well to emphasize a few of the more important points in the roentgenographic study of the disease.

Today it may be said that there is no single factor of greater importance than the x-ray in the diagnosis of pulmonary tuberculosis and in the determination of the extent of the involvement. This does not include the establishment of the degree of activity of a lesion, something that is in the realm of the clinician and that can be done only by the careful correlation of the roentgen and laboratory findings and the clinical symptoms. The description of the extent and location of the lesions and the type of pathology present, whether exudative, proliferative or both, is only a part of the duty of the roentgenologist.

The clinician is interested in all other tissues of the chest as well as the diseased areas, and the x-ray service can be made of much more value when they are taken into consideration. The mechanical devices for lessening the size of the involved area, the aeration of the uninvolved portions of the lung, the moth-eaten areas within heavy densities which later develop into cavities, and the site and depth of the cavities themselves and the thickness of their walls should all be described as minutely as possible.

The mechanical devices are of great importance. The elasticity of the lung is lost even in small lesions and all tissues of the thorax aid in the compression of the diseased area since their force is directed along the lines of least resistance. Elevations and movements of the diaphragms, mediastinal displacements and fixations, and emphysemas should all be carefully recorded. The shift of the heart is important because cardiac positions and fixations rather than toxemias are quite often the cause of circulatory disturbances.

Too much reliance has been placed upon the single roentgenogram. It is of considerable value, but will demonstrate only the changes that have taken place up to the time the examination was made. It is subject to misinterpretation, tuberculous patients being diagnosed as negative because the roentgenogram did not show any lesion, and non-tuberculous patients being diagnosed as positive on the finding of abnormality from some other cause. A differential diagnosis is not always easy and frequently is not possible from the single film. At times, it can be made only by a series of roentgenograms taken at frequent intervals.

The value of the serial study of a case lies in the demonstration of the changes that have taken place from one examination to the next. Fluoroscopic observations of the moving parts are important, but most important are the stereoscopic roentgenograms on account of the far greater depth and detail they give. It is not necessary at this time to enumerate the advantages of stereoscopic films as compared to the single.

Another important factor or, better, an imperative factor in serial roentgenography of the chest is the standardization of technic. Without it, we are at a loss to differentiate between a technical change and a pathological change.

To illustrate this point, there is a case on record at Koch Hospital in which a young lady was a tuberculosis suspect and was referred to the Hospital shortly after having had a cold. Numerous roentgenograms over a period of time previous to hospital entrance showed an old apparently healed process in the right upper lobe. The most recent film showed decided changes in it as compared to the others. Fortunately, still an earlier film was located that was of approxi-

*Read in Section on Radiology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

mately the same density as that of the last, and the lesion was seen to be practically the same. The intermediate films had been more heavily penetrated and many of the markings were obliterated. It was decided that she had had an active lesion at one time that had healed and was being taken care of nicely.

In other words, a comparison cannot be made on films that, from a technical standpoint, are not comparable.

The routine of the interpretation of roentgenograms at Koch Hospital may be of interest. The films of the previous examination are sent to the viewing room with those of the last examination. The pathological condition seen at the time of the last examination is described and then a comparison made with those of the previous examination and all changes are noted. If there is some special point in question, all the roentgenograms in the case are studied with the physician in charge who presents the clinical and laboratory findings.

To illustrate graphically the value of serial roentgenography in pulmonary tuberculosis, the following cases are cited:

Case 1.—A graduate nurse who, in September, 1930, had some dental troubles which necessitated films of the teeth had a chest film made at the same time. It was interpreted as negative. In November of the same year she contracted a cold which cleared up in a few days, after which time she had another roentgenogram made which showed a small lesion near the left apex which was thought to be an unresolved pneumonia. Physical examination revealed nothing of importance and temperature readings every two hours for a week while awake were within normal limits except twice when they recorded 99.4°. Roentgenograms were made at frequent intervals to watch the resolution of the pneumonia but, instead of a resolution, there was a gradual spread of the lesion which was quite definite in the examination of February, 1931. The point of interest in this case is that the serial roentgen ray ex-

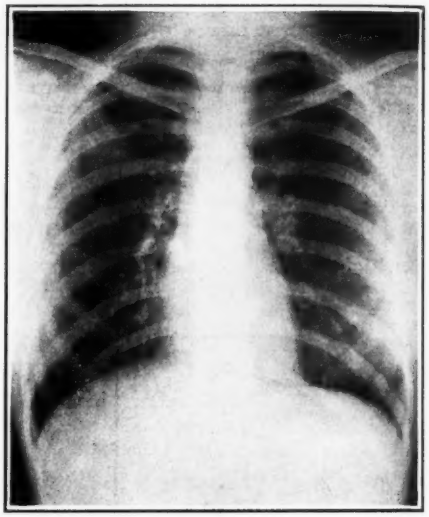

Fig. 2, Case 2
After six months of routine treatment, the physical and x-ray evidence of disease had disappeared.

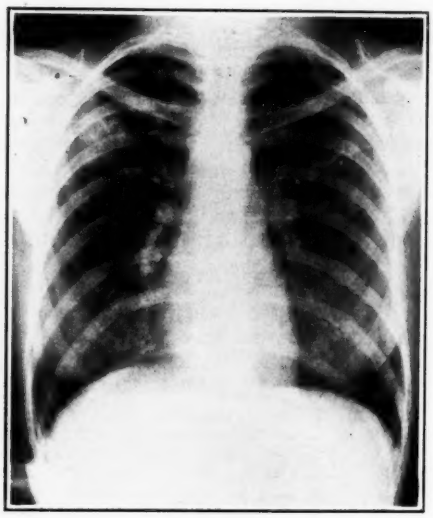

Fig. 1, Case 2
Early exudative lesion in right upper lobe and a small amount of infiltration at the periphery of the left upper lobe.

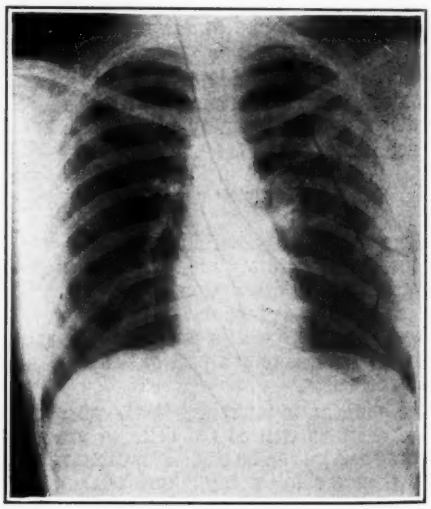

Fig. 3, Case 2
Eight months later, there was a reactivation with cavitation in the upper left lobe.

amination and the Schilling blood count were the only findings of a progressive lesion. All other tests were negative.

Case 2.—A white woman, age twenty-six, entered the Hospital in July, 1929, with a hemorrhage. The x-ray examinations showed an early lesion in the right upper lobe and a small infiltration in the left upper lobe. The sputum was positive and the blood picture toxic. Physical findings were lacking and the temperature was normal. After six months of routine treatment, x-ray and physical evidence of the disease had disappeared. In June, 1930, there was a re-activation in the left upper lobe with x-ray evidence of heavy infiltration with beginning cavitation. After a few months of conservative treatment this lesion also disappeared. In December, 1930, there was another acute flare-up with x-ray evidence of a heavy exudative infiltration in the left upper lobe followed by cavitation. Pneumothorax was instituted, producing a good collapse of the lung and an improvement in the symptoms. At this time, the disease is apparently under control.

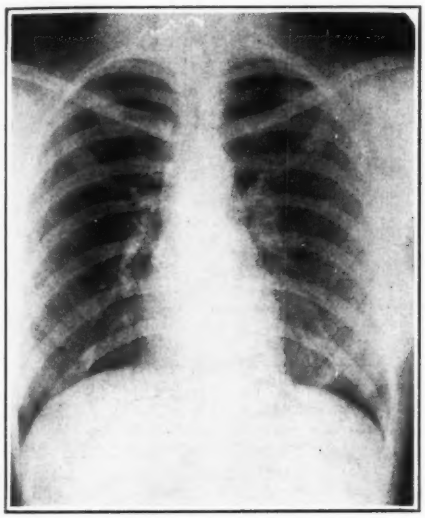

Fig. 4, Case 2
After a few months of conservative treatment, this lesion also disappeared.

Case 3.—A white woman, age twenty-one, began with cough, loss of weight, and night sweats in July, 1928. She entered the Hospital in March, 1929, with a far advanced pulmonary tuberculosis chiefly of the left upper lobe in which there was a large cavity. The right apex showed a moderate infiltration. The patient refused a pneumothorax and received nothing but conservative treatment. The cavity gradually decreased in size, and in time completely disappeared. In August, 1929, a pleural effusion developed on the left but was soon absorbed. She left the Hospital in May, 1930, against advice but has remained in good health to date.

Case 4.—A white boy, age eleven, had a history of being a contact case. His mother, two sisters, and one brother died of pulmonary tuberculosis and one sister was a patient at Koch Hospital at the time of admittance. On routine examination all physical findings were normal, but the patient was under weight. The x-ray findings were suggestive of an early tuberculous process and the patient was placed in the Hospital as an observation case. After six months, he had developed a definite tuberculous lesion in the right upper lobe with

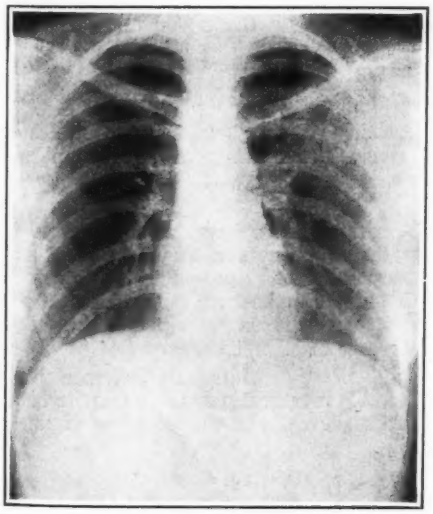

Fig. 5, Case 2
Three months later there was another acute process in the left upper lobe with exudative infiltration and cavitation.

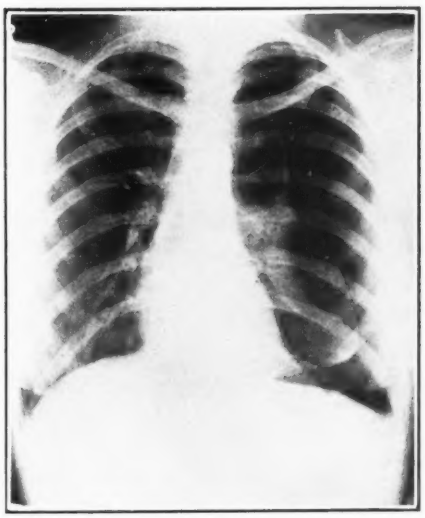

Fig. 6, Case 2
Pneumothorax was instituted, and one year later the patient was discharged as an arrested case.

cavity formation. Pneumothorax was successful in controlling the disease, and after four years and eleven months he was discharged as an arrested case.

Case 5.—A white woman, age thirty-five, with a history of having been tuberculous for four years, was admitted to the Hospital with a far advanced pulmonary tuberculosis; positive sputum, toxic blood picture, and temperature above 100°F. There was x-ray and physical evidence of bilateral involvement with cavitation in the right apex and right hilus. The patient was about two months pregnant on admission and for that reason no treatment other than routine hospital care was given. During and following the pregnancy, the tuberculous process retrogressed and eventually the cavitation completely disappeared. Her clinical course ran parallel to the x-ray and physical findings, and two and a half years later she was discharged as an arrested case.

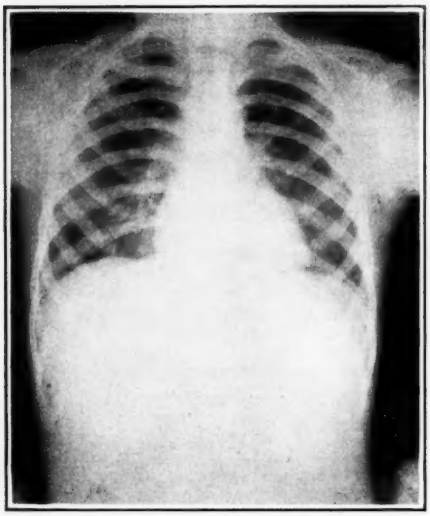

Fig. 7, Case 4
Observation case with rather heavy markings suggesting a childhood tuberculosis.

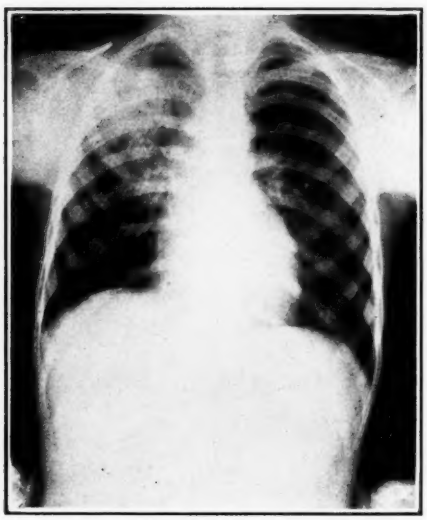

Fig. 8, Case 4
Six months later, a definite tuberculous lesion of the right upper lobe had appeared.

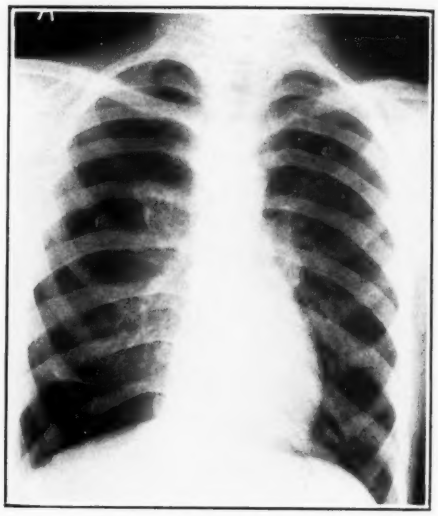

Fig. 9, Case 4
Pneumothorax was instituted and four years later the patient was discharged as an arrested case.

CONCLUSIONS

The single roentgenogram demonstrates only the changes that have taken place up to the time the examination was made. It is of value if not relied upon too extensively.

A series of roentgenograms at intervals demonstrates the changes as they take place and is the most satisfactory procedure in the roentgenologic study of pulmonary tuberculosis. At times, it may prove a lesion to be progressive, even in the absence of other findings.

Standardization of technic is imperative for comparable roentgenograms. It is quite hazardous to make comparisons of films of unequal density.

Metropolitan Building.

DISCUSSION (*Abstract*)

Dr. W. R. Brooksher, Jr., Fort Smith, Ark.—There is universal acceptance of the importance of the roent-

gen ray examination in the diagnosis, treatment and prognosis of pulmonary tuberculosis. The diagnosis having been established, the roentgen ray assumes the role of registering the changes which may take place in the existing focus or in the development of new areas of the disease. The serial film is generally conceded to be the most reliable method of following the course of the disease, and by its use diagnostic and prognostic errors may be avoided. The comparison of serial films gives a graphic permanent record of the progress of the case and has been ideally demonstrated in the lantern slides of the author. The extension of the lesion to the other lung, or to another level of the same lung, the appearance of a cavity or the gradual progression of an active lesion to a hard, fibrotic, healed affair may be readily demonstrated. Similarly, the appearance of pleural adhesions, retractions of the trachea, diaphragm or mediastinum and other complications, are clearly shown. The roentgen ray is of great value during the course of collapse therapy, all its associated factors being most readily and accurately shown.

Dr. W. R. Bethea, Memphis, Tenn.—One may make a more correct diagnosis of tuberculous lesions by repeated examinations noting the changes in the lesions, location, distribution, character, stage as acute or chronic, and progress of the disease. The clinical comparison will be of great value in determining whether a lesion is acute or chronic, therefore, consultation with the clinician is always desired. The laboratory report is not always of great importance, as many tuberculous cases have negative sputum.

I wish to add to the subject the use of both the fluoroscope and radiograph as an aid in the treatment of tuberculosis. The treatment of choice may be determined, especially if artificial pneumothorax or any other form of surgery is employed. Adhesions in the pleura may be determined when a needle is in the pleural cavity for pneumothorax, when the lung has been properly collapsed by air, by the rapidity of absorption of air from the pleural cavity. In our nonsurgical cases the progress of treatment is easily determined by plates of the same density and technic. Such plates should always be carefully compared, as has been stated by the essayist.

Last, but many times not least, is the impression made on most patients by showing them the plates. Patients who cooperate poorly will be impressed and will cooperate better after seeing the lesions in their chest. Those more despondent will be encouraged to see the progress from time to time, which is shown by serial plates. This, of course, should be done with care and caution as some might be made more despondent by the procedure.

Dr. S. B. McPheeters, Montgomery, Ala.—Serial x-rays were found by Dr. F. Maurice McPhedran to be the most reliable prognostic indication, as the result of an extensive comparison between serial x-rays, the sedimentation test and the blood picture. The report of the Committee on Prognostic Indices of the American Sanatorium Association at its last meeting in Colorado Springs was to the same effect, though there was a notable dissent from this conclusion registered in a minority report.

Dr. Titterington (closing).—The five cases presented were picked from a large number at Koch Hospital on account of the striking changes that had taken place. All of these cases terminated favorably; however, it is needless to say that we have our share that do not do as well.

All the various types of chest surgery are performed at Koch, but time was insufficient to give a complete series covering all the different types. We feel that the x-ray service has been made much more valuable since the serial study of films has been adopted as a routine measure.

THE ETIOLOGY OF HEART DISEASE*

By JULIAN E. GAMMON, M.D.,
Jacksonville, Fla.

The great majority of patients who seek advice regarding their hearts have functional heart disorders. The physician errs frequently in interpreting a systolic murmur as symbolic of mitral disease in the absence of other more reliable evidence of heart pathology. The overacting heart offers many pitfalls. A rumbling murmur and snapping first sound are frequently heard when the stethoscope is applied over the interspace from rib to rib, due to vibration of the thin chest wall under the stethoscope as a result of the forceful apex beat. The vibration of the interspace can be obviated by placing the stethoscope in the interspace and on one rib. Rasping cardio-respiratory murmurs are frequent and of no significance. During the World War thousands of overacting hearts were wrongly diagnosed mitral stenosis, hyperthyroidism and myocarditis. Many of these patients after slight or moderate exertion developed marked tachycardia, palpitation, breathlessness, precordial pain, giddiness, marked fatigue, and they were usually physically inferior, constitutionally inferior or psychoneurotic. These patients were classified as showing effort syndrome, as there was no demonstrable evidence of organic heart disease.

A reflex angina may have its cause in the gall bladder.

I recall examining a patient, age 45, who had been invalided for seven years on account of intense substernal anginal pain produced on slight exertion. Before presenting herself for examination she had been hospitalized for seven months on account of the pain produced on slight exertion. I could not demonstrate evidence of organic heart disease but instead found definite evidence of chronic cholecystitis without jaundice or gall-stone colic. Cholecystectomy was done and a thin-walled gallbladder free of stones was found adherent to the duodenum. The duodenum and pylorus showed no evidence of ulcer. Five years after the operation the patient's reply to a questionnaire is as

*Read in Section on Pediatrics, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

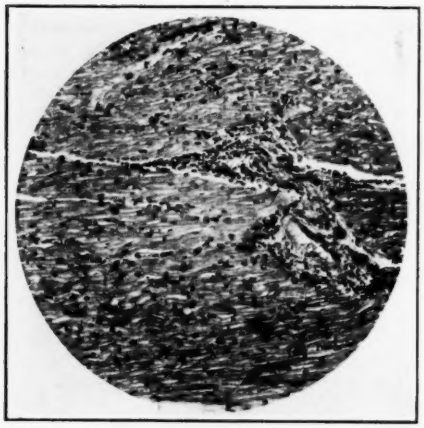

Fig. 1
Rheumatic fever. Aschoff bodies. Showing perivascular changes.

Fig. 2
Syphilis. Chronic interstitial myocarditis. Myocardial degeneration.

follows: "For the past five years my health has been almost one hundred per cent good."

Congenital heart disease is not rare and when babies with this condition are born blue, they soon die of anoxemia. Minor defects may not cause any symptoms of cardiac embarrassment. Embryological maldevelopment and inflammatory reactions of uncertain causes are the factors involved in congenital heart disease.

The most frequent causes of chronic organic heart disease are rheumatic fever, syphilis, vascular hypertension, arteriosclerosis and senility. Each disease has its characteristic pathology, all have a common feature, damage to the coronary system. It is largely through this damage and the resultant defective oxygen supply to the heart muscle that heart failure occurs in these patients.

Rheumatic fever not only damages the vascular and perivascular structures in the heart muscle. It is the most frequent cause of mitral stenosis and aortic insufficiency in children. The cause of rheumatic fever is unknown. The pathological changes in the heart, joints, subcutaneous nodules and in the brain have been carefully studied, and bit by bit a fairly complete picture of the disease has been drawn. The main features are exudation and proliferation of the endovascular and perivascular fixed cells with little necrosis as compared to the amount of tissue reaction. Rheumatic fever is a most frequent cause of pericarditis.

The clinical picture of the disease varies, of course, as does the pathology, ranging from tonsillitis, growing pains, acute arthritis, subcutaneous nodules and chorea, to acute and chronic organic heart disease. I do not think, however, that we can say that all cases of tonsillitis are rheumatic any more than we can say that all growing pains are rheumatic. There are doubtless other causes. The arthritis leaves no deformity but a chronic heart disease is most frequent following rheumatic fever and indeed it may occur without arthritis. Removal of diseased tonsils and a tropical or sub-tropical climate are our best preventive measures for rheumatic fever.

Congenital syphilis of the heart is not infrequent and it is here that the most characteristic

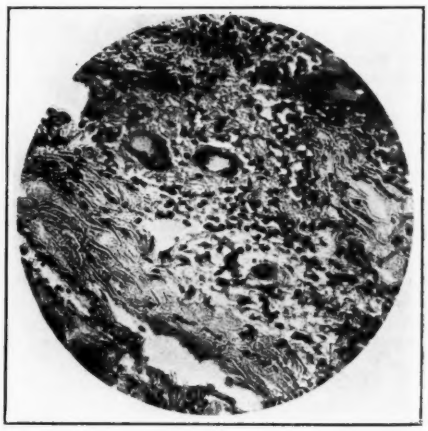

Fig. 3
Tuberculous pericarditis.

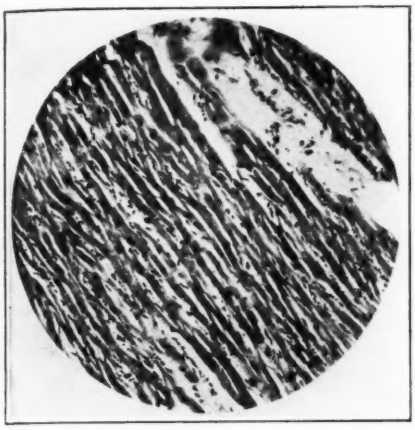

Fig. 4
Toxic myocarditis. Fibroblastic change, interfibrillar, in patient with sepsis following abortion.

picture of the disease is seen, sometimes called tiger heart, due to arteritis and extensive necrosis of the heart muscle with replacement by scar tissue and round cell infiltration. Gummatous lesions may also be seen. Acquired syphilis of the heart occurring in middle life usually begins in the aorta, and extends to the aortic valves and coronary system producing extensive heart damage.

Coronary occlusion, thrombosis and infarction and myocardial failure due to hypertension, arteriosclerosis and senility are not of interest to pediatricians and will not be discussed further.

The quick-acting bacterial infectious diseases such as pneumonia, scarlet fever, diphtheria, typhoid fever and sepsis with marked toxemia may produce acute myocardial degeneration and even toxic death. Usually, if the patient survives, the acute myocardial changes resume the normal histological picture. They rarely leave extensive permanent damage, but the patient may require prolonged convalescence before the heart can be retrained to a normal myocardial reserve. Anoxemia produced in respiratory diseases such as pneumonia and influenza may be the last straw precipitating sudden heart failure. Experimentally diphtheria toxin causes sudden death by respiratory paralysis and in animals death can be obviated by artificial respiration. In scarlet fever, endocarditis and pericarditis may occur and glomerulonephritis, which occurs frequently as a result of scarlet fever may later cause toxic myocardial degeneration and death.

Acute and subacute bacterial endocarditis is most frequently a part of general bacterial sepsis and due to streptococci, staphylococci, pneumococci and rarely gonococci. The mortality rate is high, and embolism with infarction is frequent, on account of the soft vegetations which are easily dislodged. Minor valvular deformities may occur in the small number who survive.

Purulent pericarditis is likewise a part of general sepsis. Pleuro-pericarditis is not infrequent in pneumonia. Fibrinous pericarditis is observed in the terminal stages of nephritis and leukemia. Tuberculosis frequently causes pericarditis. Rheumatic fever is the most frequent

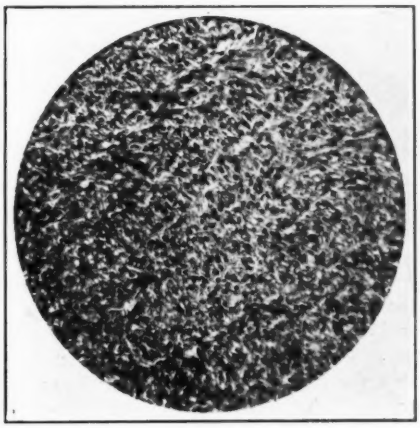

Fig. 5
Toxic myocardial degeneration. Lobar pneumonia (child).

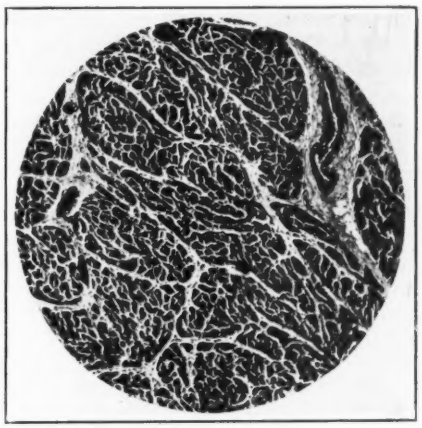

Fig. 6
Chronic interstitial myocarditis. Myocardial degeneration. Pulmonary congestion.

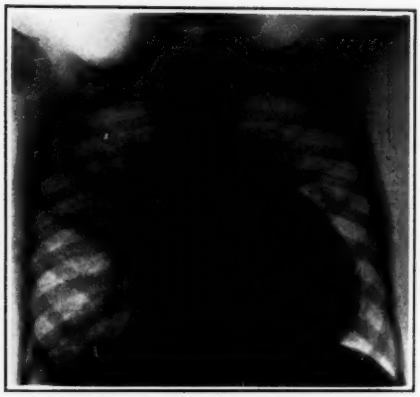

Fig. 7
Hookworm disease. Severe anemia. Dilated heart. After repeated transfusions and vermifuge treatments the heart returned to normal size.

cause. Pericardial adhesions may later become extensive and cause marked hypertrophy and dilatation. There is fibrous invasion of the myocardium beneath the visceral pericardium. From a mechanical viewpoint the heart muscle as an efficient pump is greatly handicapped by extensive pericardial adhesions.

Now, let us turn to the physiology of heart muscle. Physiologists have demonstrated the fact that the heart zealously guards its glycogen supply, and that efficient cardiac function is dependent upon adequate supplies of glycogen and oxygen; and further, insulin and glucose plus oxygen are necessary in maintaining an adequate glycogen supply.

Thyrotoxicosis decreases the glycogen of the heart muscle about 60 per cent. Even on a high carbohydrate diet hyperthyroid hearts cannot replenish their glycogen. Further, the hyperthyroid heart is more sensitive to oxygen withdrawal than a normal heart. Toxic death may occur. Congestive failure is rare except in those who have chronic disease of the coronary system.

In a recent summary of heart muscle physiology and circulatory failure, Dr. Meakins, of Montreal, said:

"There are three important known conditions which may lead to failure of the cardiac muscle to function properly through a defect in glycogen metabolism. They are oxygen want, thyrotoxicosis and insulin deficiency."

In view of these physiological facts I want to present a case of oxygen want and congestive failure due to a marked anemia resulting from severe hookworm infection.

The boy was thirteen years old. On admission to St. Vincent's Hospital his red blood count was 1,410,000, and hemoglobin 15 per cent. His heart was dilated, he was short of breath and there was dependent edema. After several transfusions of blood his red blood count rose to 2,510,000, and hemoglobin to 25 per cent, or 3.85 grams per 100 c.c. of blood. He has had 31 vermifuge treatments with carbon tetrachloride and hexylresorcinol. His stools still contain numerous hookworm ova. His last blood count was red cells 4,170,000, hemoglobin 74 per cent or 11.48 grams per 100 c.c. of blood. The heart has returned to normal size.

In conclusion, heart death may be due to structural and mechanical changes, toxic states, or defective glycogen metabolism.

(I) Structural and mechanical changes may be incident to inflammatory and degenerative processes such as:

(a) Coronary disease and infarction.

(b) Valvular defects and embolism.

(c) Adhesive pericardium.

(d) Arrhythmia.

(II) Toxic states occur in acute bacterial infections and following poisons such as phosphorus.

(III) Defective glycogen metabolism may be due to:

(a) Anoxemia as in:

(1) Congenital heart disease.

(2) Respiratory diseases causing inadequate lung ventilation.

(3) Impoverished blood in severe anemia.

(4) Insufficient oxygen saturation as in carbon monoxide poisoning.

(5) Total cessation of oxygenation as in cyanide poisoning.

(6) Inability of an adequate blood supply to reach the heart muscle on account of coronary disease.

(b) Thyrotoxicosis.

(c) Inadequate insulin supply.

700 Professional Building.

DISCUSSION (*Abstract*)

Dr. C. C. McLean, Birmingham, Ala.—Statistics show that of the total cardiac deaths, rheumatic fever comprises 35 to 40 per cent, arteriosclerosis 30 to 40 per cent, syphilis 8 to 10 per cent, unknown 10 to 20 per cent. The unknown group, it is believed by most investigators, are chiefly of rheumatic origin, the heart condition being the only manifestation of the rheumatic infection.

Of organic heart lesions in children, from various parts of the United States, statistics indicate that 70 to

85 per cent are of rheumatic origin, 10 to 20 per cent congenital, 3 to 10 per cent from other causes and 5 to 10 per cent unknown.

Rheumatic fever in its varied manifestations is the chief cause of organic heart disease in childhood. For many years the cause of rheumatic fever was ascribed to various factors.

The latest conception of the disease is that rheumatic fever is probably an allergic response in the body to an active focus of infection. It has been shown that tissue sensitivity can be created in animals by the establishment of a focus of infection. This can be done by the introduction beneath the skin of a mass of fluid agar which solidifies on cooling in the body. Streptococci then may be introduced in this area of agar implant so that their growth is not interfered with by tissue cells. From this area bacterial products can pass readily into the blood stream in much the same way that they might do from an infected tonsil or sinus. Following this procedure these animals can be tested by intracutaneous injections of bacterial filtrates and it can be shown that there is a definite response, indicating an acquired sensitivity.

Swift and his associates have shown that hypersensitive animals may be caused to lose their hypersensitive state by suitable intravenous immunization. Hypersensitive animals moreover show a much lower antibody content in their blood than do intravenously injected animals. In several respects, therefore, the tissues and immune reactions of hypersensitive animals and rheumatic fever patients are comparable, while in intravenously immunized animals they are comparable with those of patients with subacute bacterial endocarditis.

The various manifestations, complications and sequelae so often associated with rheumatic fever in the North are more common in the South than is generally recognized, but the character of the disease is not precisely the same.

In a recent review of case records from the Children's Hospital in Birmingham, it was found that during a ten year period in children of all ages, the admission rate of rheumatic fever was 1.8 per cent. In children between the ages of 3 and 13 years the admission rate was 2.5 per cent. Of the 122 rheumatic fever patients, a diagnosis of cardiac disease was made in 84 per cent, arthritis in 20 per cent, chorea in 16 per cent, and pericarditis in 4 per cent.

Of the 102 cardiac cases, there was definite hypertrophy of the heart in 61 per cent, and decomposition in 24 per cent. The mortality for cardiac disease in the hospital was 11 per cent.

In the comparison of the incidence of arthritis, chorea and cardiac disease associated with 122 rheumatic fever patients from the Children's Hospital, Birmingham, and 372 cases reported by Wilson from the Heart Clinic of the New York Nursery and Child's Hospital, Department of Pediatrics, Cornell University Medical College, New York City, in children of corresponding ages, it was found: (1) The incidence of arthritis was 46 per cent greater in New York City than in Birmingham. (2) The incidence of chorea was 26 per cent greater in New York City than in Birmingham. (3) The incidence of cardiac disease was 4 per cent greater in Birmingham than in New York City. (4) The incidence of cardiac disease alone in rheumatic fever patients was 52 per cent greater in Birmingham than in New York City.

In the South, rheumatic fever is a disease primarily of the heart. The condition is characterized by an insidious onset, and cardiac involvement is out of proportion to the severity of arthritis and chorea.

Dr. Gammon (closing).—I do not want to leave the impression that rheumatic fever and syphilis are the only infectious diseases causing heart disease. They are, however, the most frequent causes of chronic organic heart disease. Rheumatic fever heart disease occurs most frequently in children and young adults and syphilitic heart disease occurs frequently in infancy and middle life. The permanent damage is due largely to vascular and perivascular changes in the coronary system which interfere with the metabolism of the heart muscle.

As was demonstrated in the lantern slides, the quick-acting diseases such as pneumonia, typhoid, scarlet fever, diphtheria, and sepsis may cause extensive myocardial degeneration and toxic death. If the patient survives, a normal histological picture is usually resumed, and after sufficient convalescence, the heart muscle regains its normal reserve. Minor valvular defects and pericardial adhesions may remain in some instances.

I wish to stress the importance of severe grades of anemia and of anoxemia as causes of failure of the myocardium to function properly.

CYSTS OF THE KIDNEY*

By A. I. Dodson, M.D., F.A.C.S.,
Richmond, Va.

A review of the literature indicates that cysts of the kidney occur infrequently. This is probably due to a number of factors. The solitary cyst may exist without interfering seriously with the function of the kidney, and owing to its slow growth may be unrecognized. Many of these cysts are operated upon by general surgeons while exploring the abdomen for an abdominal tumor, and consequently, do not find their way into urological literature. That a goodly number exists unrecognized is proved by autopsy reports. Charles F. Branch[1] concludes that they occur in 3 to 5 per cent of all autopsies. Polycystic disease frequently gives no symptoms until the disease is far advanced and death often occurs before any very careful study of the case has been made.

TYPES OF CYSTS OF THE KIDNEY

Only a few of the different types of cyst are of clinical significance. The multiple small cysts found in chronic nephritis are of interest only to the pathologist. Tuberculous cysts oc-

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cur as the result of liquefied occlusion of tuberculous processes. Dermoid cysts are found very rarely and probably should be classed as embryomata. Many tumors of the kidney undergo cystic degeneration, but such cysts properly belong with malignant tumors. Such a case has been reported by Morris Joseph[2] and by John Neff.[3]

A very interesting case of this type recently came under my observation. Mrs. B. F. was seen February 18, 1932, because of a mass in the left loin. About a week previously she had called her physician because of severe pain in the left kidney area. On examination he found a tender mass in the left loin and flank. On cystoscopic examination no evidence of disease was found. The function of both kidneys was equal and normal. Roentgenologic examination showed a normal left kidney pelvis, but a mass was outlined continuous with the lower pole of the kidney. The hemoglobin was 65 per cent, red cells 3,800,000, white cells 5,200, with 80 per cent polymorphonuclear leucocytes. Blood urea was normal. The urine contained a trace of albumin and a few red blood cells. A diagnosis of solitary cyst of the left kidney was made.

I operated upon this patient February 25, 1932, through a left loin incision. There was a cyst extending from the lower pole of the kidney with a definite groove at the junction of the cyst and kidney. The wall of the cyst was thick and adherent to the surrounding tissues (*Fig. 1*). The cyst with about half an inch of apparently healthy kidney tissue was excised and the wound in the kidney closed with interrupted sutures of chromic catgut. A frozen section of the cyst wall was immediately made by Dr. J. Shelton Horsley, who reported it to be papillary adenocarcinoma, grade two. The kidney was immediately removed and the cavity seared over with the cautery. The patient left the hospital in good condition on March 24, 1932. At the present time there is no evidence of recurrence.

Hydatid or echinococcus cysts occur in only about 5 per cent of echinococcus infections. Since this disease is rarely seen in this country, such cysts will not often be encountered. The embryo cysticercus becomes lodged in the kidney parenchyma and is immediately encysted. These cysts grow until they reach a very large size before giving symptoms. They may rupture into the kidney pelvis, extruding daughter cysts and hooklets in the urine, and producing symptoms which lead to an investigation of the urinary tract. It is in this way that the diagnosis is usually reached. Other symptoms are those characteristic of a kidney tumor, the presence of a mass, and pressure symptoms, depending upon the point of origin and the size of the cyst. Eosinophilia is frequently high and may direct one to a diagnosis. This lesion of the kidney may be treated by nephrectomy or by drainage of the cyst and swabbing the interior of the cyst with formalin, depending on the condition of the case.

The types of cystic disease of the kidney of greatest clinical interest are solitary cyst and polycystic disease.

A review of a small series of cases seen on the urological service of St. Elizabeth's Hospital during the past five years (from November 1, 1927, to November 1, 1932), indicates that this condition is not nearly so rare as reports in the literature suggest. During this five-year period there have been 70 operations upon the kidney, including 12 cases in which there was a palpable mass. Of these cases, 4 were due to dilatation of the kidney pelvis; 3 tumors of the kidney; 1 was polycystic disease of the kidney; and 4 were solitary cysts of the kidney. One case of

Fig. 1

Specimen from Mrs. B. F. In this case the cystic mass was first excised. After it was found to be carcinomatous by examination of frozen section, the kidney was removed.

polycystic disease of the kidneys with palpable masses was not operated upon.

SOLITARY CYSTS

The cause of solitary cysts has never been clearly determined. Some writers believe these cysts to be caused by inflammatory obstruction of the tubules with retrodilatation, while others hold that they are congenital in origin. Solitary cysts usually grow from one of the poles of the kidney, at times from the convex surface. In one of our patients the cysts grew from both poles. They are found just below the true capsule and at times extend to the pelvis, from which they are separated by a thin wall. They are densely adherent to a capsule of compressed kidney tissue. Frequently they do not give rise to urinary symptoms. Certain pressure symptoms may result according to the location of the cyst. When situated at the upper pole, the kidney may be pushed downward, simulating a low, movable kidney, while cysts at the lower pole are often mistaken for cysts of other abdominal structures. They can usually be palpated from front to back, and have not so wide a range of mobility as is found in ovarian cysts and omental cysts. They are situated somewhat more laterally than cysts of the pancreas. The pyelogram, while often negative, may show a pressure defect and there may be deficiency in kidney function, according to the extent of kidney destruction. One of our patients with solitary cyst of the kidney ran a continuous temperature ranging from 100 to 102° F., and although no definite evidence of infection could be found in the kidney, the temperature subsided within forty-eight hours after nephrectomy.

The treatment of solitary cyst of the kidney consists of excision of the cyst, or of nephrectomy, depending upon the amount of kidney damage and the functional capacity of the opposite kidney. Drainage of the cyst gives only temporary relief.

The following is a brief history of 4 such cases seen at St. Elizabeth's Hospital during the past four years:

Mrs. T. A. W. was admitted to the hospital October 3, 1929, complaining of a mass in the right side of the abdomen. The mass was noticed about three years before admission, but gave no particular trouble until the past three or four months, when it seemed to grow larger and became sore and painful. The patient was a well-developed, rather stout woman, 62 years of age. The physical examination was negative except for a movable mass in the right upper quadrant of the abdomen. The mass was tender to touch and could be definitely palpated both in the loin and in the right upper quadrant of the abdomen. The hemoglobin was 70 per cent, red cells 3,800,000, white cells 6,800, with 69 per cent polymorphonuclear leucocytes. The urine contained a trace of albumin and a few pus cells; specific gravity varied from 1.010 to 1.020. Phenolsulphonephthalein elimination was 75 per cent the first hour and 5 per cent the second hour. Cystoscopic examination showed the bladder mucosa normal. Indigo carmine given intravenously appeared freely from the left kidney in five minutes and rather faintly from the right kidney in eight minutes. Pyelogram showed definite dilatation of the right kidney pelvis and the roentgenologist reported a mass apparently continuous with the right kidney. On October 5, 1929, Dr. J. S. Horsley, by an abdominal nephrectomy, removed a small kidney, 1.5 x 6 cm. in size, with a dilated pelvis and a cyst extending from the convex surface (*Fig. 2*). The cyst measured 11 x 10 x 9 cm. The patient was discharged well on November 14, 1929.

Dr. R. M. H. was admitted to the hospital September 22, 1930, complaining of a movable mass in the right side of the abdomen. He had had several attacks of pain in the region of the right kidney within the preceding eight years, but only within recent months was he able to palpate a mass in the abdomen. The mass was quite movable and was considered by the patient to be a movable kidney. The patient was a well-developed man about fifty years of age. The physical examination was negative except for the movable mass in the abdomen. When the patient was

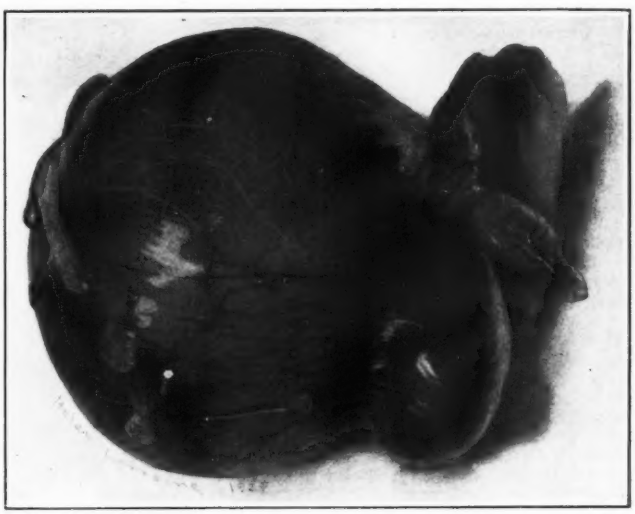

Fig. 2

Drawing of specimen removed from Mrs. T. A. W. Note the large cyst growing from the convex surface of the kidney.

Fig. 3
Specimen removed from Dr. R. M. H., showing cysts at both poles of the kidney, yet with very little encroachment on the kidney pelvis.

standing, the mass presented well below the crest of the ilium; when he was supine it could barely be palpated below the ribs. The hemoglobin was 70 per cent, red cells were 3,750,000, white cells 7,600, with 79 per cent polymorphonuclear leucocytes. Blood urea was 58 mg. per 100 c. c. of blood. The urine contained a trace of albumin; specific gravity was 1.015; there were 8 to 10 pus cells to the high power field. Cystoscopic examination showed the bladder mucosa to be normal in appearance. Indigo carmine given intravenously was eliminated freely from the left kidney in five minutes and from the right in seven minutes. X-ray examination was negative for stone. The pelvis of the kidney was well filled and normal in outline. The calyces were poorly distended and appeared to be encroached upon by a growth. On September 24, 1930, Dr. J. S. Horsley did a right nephrectomy through a lumbar incision. The specimen consisted of the kidney and two cysts, one growing from each pole (*Fig. 3*). The specimen was 15 cm. in length, 12 cm. in diameter at the lower pole and 6 cm. at the upper pole. The patient was discharged from the hospital on October 19, 1930, in good condition.

Mrs. J. B. W., age fifty-three years, was admitted to the hospital on May 20, 1931, complaining of burning pain in the right upper quadrant of the abdomen. The onset of these symptoms was twelve years before admission, at which time she noticed a small mass in the right upper quadrant of the abdomen. Eight years before admission she was operated upon and a cyst of the right kidney drained. The surgeon exp'ained to her that because of the condition of the opposite kidney a more radical operation was not advisable. The symptoms were relieved until about five months before the present admission. She was a well-developed woman. The physical examination was negative except for a tender mass in the right upper quadrant of the abdomen. The hemoglobin was 65 per cent, red cells 3,450,000, white cells 8,600, with 78 per cent polymorphonuclear leucocytes. Blood urea was 50 mg. per 100 c. c. of blood. Phenolsulphonephthalein test was 34 per cent the first hour and 33 per cent the second hour. Cystoscopic examination showed the bladder mucosa mildly congested. Indigo carmine appeared from both sides in five minutes, but much more concentrated on the left side than on the right. X-ray examination was negative for stone. The left kidney outline was normal in size and position. The right kidney outline extended well below the crest of the ilium. Pyelogram of the right kidney showed the upper calyx and pelvis normal, while in the lower calyx a small defect in the lower inferior portion indicated pressure. On May 25, 1931, I operated under spinal anesthesia. A loin incision was made and a cystic mass 7 x 8.5 cm. excised from the lower pole of the kidney. The wound in the kidney was closed with interrupted sutures of chromic catgut. The patient was discharged from the hospital on June 6, 1931, in good condition, and when recently heard from was free of symptoms.

Mrs. J. H. N., age fifty-nine years, was admitted to the hospital on November 30, 1931, complaining of pain in the left flank and left upper quadrant of the abdomen of four months' duration. The pain had been constant and had at no time radiated. There had been no frequency of urination or any bladder discomfort. For about a week before admission the patient had had an elevation of temperature, the pain had been worse, and she had been confined to her home. She was a well-developed woman. The physical examination was negative except for tenderness and a rather indistinct mass in the left upper quadrant of the abdomen. Her temperature on admission was 100°, hemoglobin 70 per cent, white cells 7,200, polymorphonuclear leucocytes 82 per cent. Blood urea was 38 mg. per 100 c. c. of blood. The urine contained a trace of albumin, but was otherwise negative. Blood cultures and agglutinations were negative for all of the contagious fevers. Cystoscopic examination on November 30 showed the bladder was normal. Indigo carmine was eliminated freely from both kidneys in five minutes. X-ray examination showed a mass apparently in contact with the left kidney. Pyelogram of the left kidney was negative. On December 6, 1931, a left nephrectomy was done through a lumbar incision. The specimen measured 12 x 9 x 2 cm. There was a translucent cyst at the upper pole which measured 8 cm. in diameter (*Fig. 4*). The patient's temperature became normal in forty-eight hours and she was discharged from the hospital on December 24, 1931.

POLYCYSTIC DISEASE

Polycystic disease of the kidney is a congenital condition and is considered to be practically

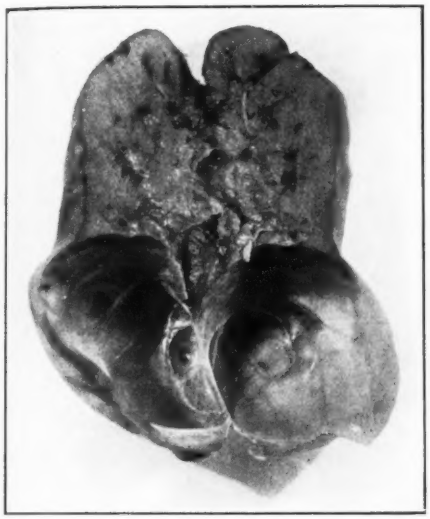

Fig. 4

Specimen removed from Mrs. J. H. N. She had a large solitary cyst occupying the upper pole of the left kidney with minute cysts in the region of the lower pole of the kidney.

always bilateral. The disease may run its course in infancy or early childhood, or may exist until late in life. The largest percentage of cases is seen in the fourth decade. There are many theories as to the cause of polycystic kidney. Young[4] discussed the following most prominent theories:

Virchow believed that the condition resulted from closure of the papillary ducts resulting from inflammation. Bridigi and Severi considered it a neoplastic disease. They noted epithelial proliferation from the tubules of the kidney into the surrounding connective tissue, and thought that these became converted into cysts through degenerative changes. Pseudo-papillary formation on the inner walls of many of the cysts showed the similarity to cyst-adenoma of the ovary. The theory of Hildebrandt is held by the majority of investigators to be true. He believed the condition to be due to malunion of the collecting tubules and the metanephrogenic structures, so that with the beginning of secretory activity of the glomerulus and the kidney tubule, a cyst is formed. Many observers have noted a marked hereditary tendency, the disease often occurring in two or more members of the same family and in succeeding generations. The disease, according to Young, is recognized in three clinical types: the uremic form, running a very short course from only a few days to a few weeks, the patient previously in reasonably good health going downhill rapidly with headache, drowsiness, abdominal distention, hiccough; the chronic nephritis form, which runs a much longer course, usually for ten, or even twenty years after diagnosis, showing the clinical characteristics of a true chronic nephritis with circulatory changes and albuminuria; and, finally, those cases which come to operation as the result of infection, obstruction, or rupture of some of the cysts. This last may be called the surgical form and usually has a duration and onset of from 3 to 4 years. The symptoms may simulate any of the major surgical lesions of the kidney, such as hematuria, lumbar pain, kidney colic, and pyuria.

The diagnosis of polycystic disease is not so difficult as in other cystic diseases of the kidney. The growth is usually large enough to be definitely palpated before there are sufficient symptoms to require medical attention. The patient most frequently seeks medical aid because of hematuria, pain in the region of the kidneys or in the abdomen, digestive disturbances or abdominal tumor. Frequently careful examination will elicit palpable tumors on both sides of the abdomen, and the fact that the growths are bilateral will often differentiate them from most enlargements of the kidneys. The tumor is tense and irregular in outline because of the numerous cysts. The kidney pelvis is greatly lengthened and the calyces are separated and elongated so that the distance from the upper to the lower calyx may be twice the normal. There is rarely a filling defect or obliteration of the calyx as is seen in tumors of the kidney. Pyelogram on the opposite side will often show a similar picture. The attacks of bleeding, which are a frequent symptom of both tumor and cyst, are much more often accompanied by pain in cystic disease than in tumors. This is thought to be due to the rupture of a blood vessel into the cyst cavity.

The treatment of polycystic disease is chiefly a medical problem and should be conducted according to the principle followed in the treatment of chronic nephritis. Surgery should be resorted to only when the case is complicated by obstruction, stone, infection, severe hemorrhage, or when pain becomes unbearable. The choice of operation, whether to puncture the cyst for relief of tension, or drain or remove the kidney, is an individual problem.

The following cases are of interest:

Mr. N. C. C., age sixty years, was admitted to the hospital on January 21, 1929, complaining of pain in both lumbar regions and in both lower quadrants of the abdomen. The pain had been present for about twenty years and during this time he had had a number of severe attacks of pain in the region of the left kidney. These attacks occurred at varying intervals, sometimes twelve months apart and sometimes two or three attacks in a single month. Occasionally the pain seemed to pass over from the left to the right side and there was a dull ache in the right kidney. About a year before admission the patient became unconscious and was either unconscious or irrational for a period of about three months. He had suffered nocturia three or

four times and considerable frequency during the day. He was a rather large, well-developed man, and the abdomen was quite pendulous. Two very large masses could be palpated extending from the flanks downward well below the crest of the ilium. The masses were irregular and somewhat tender on deep palpation. The hemoglobin was 65 per cent, red cells were 4,200,000, white cells 8,800, with 80 per cent polymorphonuclear leucocytes. Blood urea was 40 mg. per 100 c. c. of blood. Phenolsulphonephthalein elimination was 35 per cent the first hour and 40 per cent the second hour. The urine contained a trace of albumin, specific gravity 1.010, with practically no variation, numerous red cells and a few white cells. On cystoscopic examination the bladder mucosa was generally congested and both ureteral orifices were normal in location. Indigo carmine was eliminated in traces from the left kidney at the end of ten minutes. At this time there was no elimination from the right kidney. Catheters were passed to the kidney pelves and specimens of urine collected. The specimen from the left kidney contained an appreciable amount of dye; the specimen from the right kidney showed a residual of about one ounce of slightly cloudy urine and no dye. After about five minutes, fifteen minutes from the time of administration, the dye appeared from the right kidney. Bilateral pyelogram showed decided dilatation of the right kidney pelvis and upper ureter. There was no dilatation on the left side. Both kidney pelves gave evidence of pressure. A diagnosis of polycystic disease was made and the patient returned home under the care of his physician. He lived in reasonable comfort for about two years and finally died in uremia.

Mr. G. W. K., age forty-five years, entered the hospital on August 26, 1931, complaining of pain in both lumbar regions and in the left lower quadrant of the abdomen. The patient stated that three weeks before admission he suffered severe pain over the right kidney and over the entire lower abdomen. About four days after the onset he had chills daily for almost a week and from time to time passed gross blood in the urine. About a week before admission he noticed rather severe pain in the left lower quadrant of the abdomen, and at that time began to have tenderness in the left lumbar region. Examination on admission showed a sallow, emaciated man, with a temperature of 102°, pulse 100, and no characteristic findings except marked muscle spasm and tenderness in the upper left quadrant of the abdomen and left lumbar region and a sense of resistance indicating some tumor or mass in this area. No mass could be made out on the right side. The hemoglobin was 80 per cent, red cells were 4,800,000, white cells 14,000, with 84 per cent polymorphonuclear leucocytes. Blood urea was 69 mg. per 100 c. c. of blood. Cystoscopic examination showed the bladder mucosa generally congested. Both ureters were catheterized. The specimen from the left kidney contained numerous pus cells. The specimen from the right kidney showed a few pus cells. Phenolsulphonephthalein given intravenously appeared from the right kidney in four minutes and from the left kidney in ten minutes. In a thirty-minute period 17 per cent was collected from the right kidney and 8 per cent from the left. A left pyelogram showed marked distortion of the kidney pelvis. The patient's temperature for the next three days varied from 102 to 103°. Under forced fluids, consisting chiefly of 5 per cent dextrose in Ringer's solution intravenously because of the difficulty in forcing water by mouth, the patient's general appearance somewhat improved. The blood urea came down to 38 mg. and phenolsulphonephthalein elimination was 40 per cent the first hour and 15 per cent the second hour. August 5, 1931, under spinal anesthesia, through a lumbar incision a large infected polycystic kidney was removed. The patient had a rather stormy convalescence. While the temperature returned to normal within a few days, there was definite evidence of lack of satisfactory kidney function. The blood urea had risen to 86 mg. by August 10 and at the time of the patient's discharge on August 25 it was recorded as 84 mg. per 100 c. c. of blood, although at this time the patient apparently was in very good condition. This patient was heard from within the past few weeks and his physician states that he is in much better health than he has been for years and is able to be about his regular duties on the farm.

CONCLUSIONS

(1) Cysts of the kidney occur more frequently than reports in the literature indicate.

(2) Solitary cysts frequently exist without encroaching on the kidney pelvis or seriously impairing its function.

(3) When operating upon a cystic kidney, the possibility of malignancy should be borne in mind.

REFERENCES

1. Branch, C. F.: Some Observations on Cysts of the Kidney. Jour. Urol., pp. 452-453, April, 1929.
2. Joseph, Morris: Large Renal Cyst, Simulating Solitary Cyst. Jour. Urol., pp. 297-299, Sept., 1932.
3. Neff, J. H.: Massive Hemorrhagic Cyst in a Wilms Tumor of the Kidney in an Adult. Trans. Amer. Ass'n. Genito-Urinary Surgeons, pp. 1-12, 1931.
4. Young, Hugh: Practice of Urology, 2:25-27.

Colston, J. A. C.: Solitary Cyst and Papillary Cystadenoma Occurring Simultaneously in One Kidney. Jour. Urol., pp. 285-290, March, 1928.

Cumming, R. E.: Polycystic Kidney Disease. Jour. Urol., pp. 149-177, Feb., 1928.

Dodson, Austin I.: Cystic Disease of the Kidney. Bull. McGuire Clinic and St. Luke's Hospital, pp. 17-21, Jan., 1932.

Grove, J. S.: Solitary Serous Cysts of the Kidney. Jour. Urol., pp. 661-668, June, 1930.

McKay, Robert W.: Solitary Cysts. Sou. Med. Jour., pp. 234-238, March, 1932.

McKim, G. F.; and Smith, Park G.: Solitary Serous Cysts of the Kidney. Jour. Urol., pp. 635-661, Dec., 1924.

Munger, Arbor D.: Acute Hemorrhagic Cyst of the Kidney. Jour. Urol., pp. 73-84, Jan., 1932.

O'Neil, Richard F.: Solitary Serous Cyst of the Kidney with Report of a Recent Case. Jour. Urol., pp. 269-273, Sept., 1925.

Ritter, Saul A.; and Baehr, George: The Arterial Supply of the Congenital Polycystic Kidney and Its Relation to the Clinical Picture. Jour. Urol., pp. 583-592, May, 1929.

DISCUSSION (*Abstract*)

Dr. Robert W. McKay, Charlotte, N. C.—I read a paper last year before this Section of the Southern Medical Association on "Cysts of the Kidney."

As to the etiology of solitary cysts of the kidney, Hepler, in connection with Hinnman, has presented a beautiful picture producing artificial solitary cysts of the kidney in the rabbit by urinary obstruction plus interference with the blood supply to the part of the kidney that is obstructed. When these two factors are present, either experimentally or clinically, namely: obstruction to the outflow of urine plus interference with

the blood supply producing an ischemia, solitary cysts result.

From the viewpoint of the operator it is very important always to do a nephrectomy in cases where the cyst is hemorrhagic, as I am sure that all urologists at some time or another have attempted to resect hemorrhagic cysts and have received the pathologist's report later of malignancy in the cyst wall.

After the diagnosis of polycystic kidney is made, we consider the treatment medical.

There is a very interesting family in North Carolina in which the family tree for five generations has been worked out. In the fifth generation there are 8 living children and 7 of the 8 were proved to have congenital polycystic kidneys. The fact that the disease is almost uniformly bilateral adds to the ease of its diagnosis.

I have seen 3 cases of polycystic kidney operated upon in which the operator with his finger ruptured the cysts by blunt dissection in the hope that the release of pressure would aid urinary secretion. The benefit derived from such operations on polycystic kidneys is extremely questionable.

And lastly, to reiterate a very important point which Dr. Dodson has already brought out, be sure to do nephrectomies upon all hemorrhagic cysts of the kidney.

Dr. R. E. Van Duzen, Dallas, Tex.—I shall attempt to re-emphasize four points.

First, we are able today to diagnose more cases of kidney cyst than formerly, thanks to the improvements in x-ray methods. Intravenous pyelography will bring out the renal shadow and show its relation to the cyst in which formerly the retrograde pyelogram was not conclusive.

Secondly, we must know the renal function of not only the pathologic kidney, but also its mate. I have seen a man with normal blood pressure and good renal function of either kidney develop a high blood pressure and hemiplegia within one year after nephrectomy for a solitary cyst of the kidney. The remaining kidney could not compensate for the added load thrown upon it. Its reserve could not stand the shock. A conservative resection of the cyst or marsupialization in poor risks might prevent this.

The third point I wish to discuss concerns polycystic disease of the kidneys. I have a patient who had Rovsing's operation upon both kidneys in 1914. About 1924, because of high blood pressure and a 'phthalein of only 10 per cent in two hours, she decided to go on a strict low protein diet consisting mainly of skimmed milk and fruit juices. Under this regime we watched her blood pressure drop to a systolic pressure of 130 mg. and the 'phthalein increase to 60 per cent. In 1930, I did the Rovsing operation on the left kidney because of severe pain in the left lumbar region. Since that time she has been able to increase the diet slightly. From these observations we might judge that a strict diet is most important. But strangely enough, I have watched her sister eat what she wants and lead a most active life, although she has had bilateral polycystic kidneys extending down to the crest of the ileum since 1921 and is not aware of the condition. Every case is an individual problem. Some patients do nicely without any treatment, diet helps some, catheter drainage may relieve the pain and surgery may be necessary. Again the most conservative treatment is indicated.

Lastly, we must be sure we are not dealing with a cystic degeneration of a tumor as in Dr. Dodson's case.

Dr. R. C. McQuiddy, Birmingham, Ala.—I marvel at the length of time a patient may have a solitary cyst or a polycystic kidney and still enjoy good health. I throw up my hands when I find a polycystic kidney, for other than palliative measures I do not know what to do. We find, as did Dr. Dodson, that cysts of the kidney occur more frequently than we supposed and that isolated cysts are occasionally seen in otherwise healthy kidneys. They are usually small, but sometimes attain a large size. In the watery contents of these large cysts no urinary substance can ordinarily be traced except albumin. The origin is probably fetal developmental inhibition combined with secondary snaring off processes. Brounworth considers them congenital and only quantitatively different from true cystic kidney.

Cystic kidney is found in all ages and is bilateral.

Ruckert says that malformations and developmental disturbances, especially in other parts of the urogenital system, are often found.

Dunger, Bull and others call attention to familial and hereditary predisposition. Many different opinions are advanced as to the cause of cystic kidney, but it is probably always congenital and due chiefly to developmental disturbances. No solution covering all points has been offered. Older opinions laid stress on retention due to obstruction caused by inflammation.

Virchow believed that atresia of the papillae, perhaps due to small uric acid concretions in the tubules, was responsible. Syphilis has also been blamed by Shukowsky and Ssinjoff. Nearly all observers now believe it is due, in the majority of cases, to malformation, that is, failure of certain urinary tubules to become patulous. When function begins these tubules are dilated.

We have seen in our office in the last four years 5 cases of polycystic kidney and 3 solitary cysts. So far as I am able to learn, all are living and comfortable.

A surgical procedure was attempted in one case of polycystic kidney only because of a mistaken diagnosis. The cysts were punctured. The patient had a very stormy period, but is all right at this time.

Another case I would mention is one of solitary cyst of the kidney occurring in a man 62 years of age. Thirty years ago he was told that he had a stone in the left kidney. Twenty years ago a diagnosis was made of solitary cyst of the kidney. In 1931 the kidney was removed and the diagnosis of cyst confirmed. There is a record of this case for over thirty years.

Dr. Nelse F. Ockerblad, Kansas City, Mo.—Because of our increasing diagnostic acumen, we are discovering more frequently and earlier these most curious pathological changes in the kidney. Ordinarily, one of a pair of polycystic kidneys should not be removed, but five years ago I operated upon a woman who had a very large left kidney and a right kidney of almost normal size and function. I removed this very large polycystic kidney and the patient is still living and free from the discomfort of a large tumor mass in her abdomen. The remaining kidney has shown no tendency to progressive dysfunction. Solitary cysts of the kidneys are reported with considerable regularity, though they constitute a by no means common disease. In certain cases the pain from a polycystic kidney becomes un-

bearable to the patient and it then is necessary to expose the kidney and puncture the cysts. I have on several occasions relieved the patient of painful symptoms by this procedure.

Dr. Thomas D. Moore, Memphis, Tenn.—In Dr. Dodson's presentation I was impressed by the absence of any constant or characteristic pyelographic evidences of solitary cysts of the kidney. Many of the pyelograms he displayed could reasonably be interpreted as normal. If one depends on pyelography alone, it is evident that the diagnosis may be missed with ease. It is the correlation of all of the data, including the clinical history, physical findings, functional tests and a careful study of the roentgenograms, including a close scrutiny of the soft tissue shadows, which renders possible the preoperative recognition of solitary cysts of the kidney.

In a case of my own, a woman of 54, a dull pain had been felt in the left loin at intervals for twelve years. There was no tumor palpable on physical examination; the urine was negative. Cystoscopic findings were negative, except for moderately diminished function of the left kidney, a pyelogram of which disclosed a moderate elongation and narrowing of all of the major calices. A right pyelogram was obtained for comparison, which confirmed the suspicion of a left renal tumor. The absence of hematuria and the long history were indicative of a benign rather than a malignant tumor. Exploration revealed a solitary cyst about 6 cm. in diameter, occupying the middle third. Its location rendered resection impractical and a nephrectomy was performed. In this instance the pyelogram gave the clue to the diagnosis, which otherwise would have been easily missed.

Dr. R. M. LeComte, Washington, D. C.—Two cases of renal cysts have come to hand recently one of which, so far as I have been able to determine, is unique in that hemorrhage resulting from it was the cause of an acute surgical emergency. The second case illustrates the difficulties and uncertainties of diagnosis of solitary cysts.

The first occurred in a woman of 34 years, two months post partum, who had had no symptoms of renal disease beyond a vague sensation of weight in the right flank, previous to coming under observation. At about 10:00 a. m. on May 2 she was taken with severe right flank pain and hematuria. She was seen by her physician at 5:00 p. m. in shock and presenting a palpable right lumbar mass and hematuria. On arrival at Georgetown University Hospital she was too ill to admit of anything but palliative and sedative measures. By the following morning she had improved considerably and was cystoscoped. Nothing more was discovered than hematuria from the right ureter and a normal left kidney. At operation, 30 hours after the onset of her hematuria, the right lumbar fossa was found filled with fresh and clotted blood. The upper pole of the kidney was found to be the site of a cyst which had ruptured on the posterior surface. The kidney was removed and the patient recovered.

Examination of the specimen showed a cyst with a roughened interior surface which was proved to be due to papillae. Dr. Whitmore and I have made some studies on renal cysts, at least he has been doing the work and I have been approving and applauding. By dint of hard work and the taking of some 20 sections, he has shown islands of clear celled carcinoma or Grawitz tumor in the wall of this cyst. We have found that in the 43 reported cases of hemorrhagic cysts that we have located 14, including our own, have had carcinoma cells in the wall.

The second case occurred in a man of 56 years who had had dull left lumbar pain and microscopic hematuria for 10 days. Urologic study showed an enlarged left kidney, pyelographic distortion indicative of neoplasm and a ureteral stone. At operation a moderate sized cyst of the lower pole was found. This was easily removed from the kidney and the ureteral stone was removed, with complete relief of symptoms.

We have practically come to the conclusion that etiologically there are several varieties of cyst, and that the particular cause cannot always be determined.

We believe that in hemorrhagic cysts the kidney should be removed, but that, when the contents are clear, the problem of enucleation or nephrectomy must be determined by the character of the wall of the cyst, the varying thickness and rough or smooth internal surface which is found at operation.

Dr. Milton M. Coplan, Miami, Fla.—It is not amiss to sound a word of warning relative to the attempt at making a diagnosis of renal cysts purely on the findings obtained by intravenous urography. In our own work, shadow outlines have not been sufficiently clear to permit this diagnosis without some hazard. There has been one occasion in which we overlooked a cystic disease entirely by this method, in our own practice, and another where we were able to discover the pathology by retrograde pyelography after another physician had pronounced negative findings following intravenous urography. The lantern slide just shown us by Dr. LeComte definitely illustrates this point, for while he was able to establish a diagnosis by this method, even he admits that the shadow outlines are not clear cut.

Dr. J. Shelton Horsley, Richmond, Va.—Occasionally cysts of the kidney attain a large size. In 1911, at a clinic held at Winston-Salem, North Carolina, I removed a very large cyst of the right kidney along with the kidney. Several surgeons were holding clinics for the local society on that day, and this particular patient was referred to me because of the clinical resemblance to an ovarian cyst. If the patient had been a female that diagnosis would undoubtedly have been made. I had had no opportunity to study the patient before operation except for a casual examination. The abdomen was greatly distended. There were the physical signs of fluid in a cyst and the cyst reached from the pubis well up into the epigastric region and was slightly more prominent on the right side than on the left. There were no particular urinary symptoms. The patient had not been examined with the cystoscope. At operation this large cyst, weighing probably about 40 pounds, was found to spring from about the middle of the right kidney. There was a sharp line of demarcation from the rest of the kidney, which appeared to be fairly normal. After finding the line of demarkation the cyst was easily removed along with the attached kidney. The patient made a satisfactory recovery.

This patient was assigned to me because in February, 1911, I had reported in *Surgery, Gynecology and Obstetrics* the removal of a huge ovarian cyst. The cyst weighed 116½ pounds and the patient weighed 105½ pounds after removing the cyst. The patient was a negro woman who had had the cyst for years. She made a satisfactory recovery.

Dr. Montague L. Boyd, Atlanta, Ga.—The long continuation or slow progress of the polycystic kidney

condition in some cases is well illustrated by one of my patients. He came to me August 15, 1914, aged 22, having one kidney very greatly enlarged and bleeding so badly that it was eventually necessary to remove it. The other kidney was only a little enlarged, the urine contained about one or two plus albumin, and he had a 35 per cent 'phthalein output in one hour and ten minutes after intramuscular injection.

He recovered satisfactorily from the nephrectomy and I never saw him again until November, 1931, when he came into my office to tell me how well he had been. He was inclined to boast about what a tough life he had been leading in Texas and how much whiskey he had drunk. I was not able to hold him for a complete examination, but he said he felt fine; he looked well, and his urine was clear, fairly concentrated and still had only a one or two plus albumin. The remaining kidney did not feel any larger than it had felt seventeen years before. I was very much astonished to find how little polycystic change had occurred in the remaining kidney during seventeen years, especially since the other kidney had been very large when it was removed.

Dr. Dodson (closing).—Since in our efforts to conserve renal tissue we are inclined to resect as many cysts as possible rather than remove the kidney, I wish to emphasize the importance of considering the possibility of malignancy in these cases. We should be particularly suspicious when the cyst wall is unusually thin or when there is blood-tinged fluid.

I am fully in sympathy with the most conservative treatment possible of the polycystic kidney. At times the presence of infection or obstruction demands more radical measures.

CIRCUMSCRIBED CUTANEOUS MYXEDEMA ASSOCIATED WITH POSSIBLE ENDOCRINE IMBALANCE*

By Llewellyn Williams Lord, M.D.,
and
Samuel Morrison, M.D.,
Baltimore, Md.

The very uncommon occurrence of localized areas of non-pitting edema of the skin associated with thyroid disease has resulted in a number of reports of cases demonstrating this remarkable relationship. The lesions are almost always in the skin of the lower extremities, and microscopically they seem to be definitely of myxedematous character. They have been called by various authors "localized solid edema of the extremities" or "circumscribed myxedema." Recently O'Leary[1] and Pillsbury and Stokes[2] spoke of the probable influence of the glands of internal secretion on the skin in this condition. A number of other reports of this association going back as far as 1883 have been found in the literature. It is not our purpose to present a review of the literature, since this has already been done by Pillsbury and Stokes. Briefly, the relationship of the two conditions is as follows:

A patient suffering from Graves' disease is operated upon and returns after a period of from one to five or six years with clinical recurrence of symptoms of exophthalmic goitre associated with the appearance of brawny areas of edema of the lower extremities, which are entirely symptom-free. These lesions on microscopical examination are found to contain large quantities of mucin in the corium, with other changes suggesting myxedema. They apparently have not responded to any form of therapy aimed at the thyroid intoxication, but gradually over a period of several months or years they retrogress spontaneously.

It has been our good fortune to have had under our care in the past two years a patient who has manifested this syndrome, and in view of the fact that the condition is of considerable rarity, we feel justified in reporting his case and discussing fully various factors which seem to us to be pertinent.

J. R., male, a newspaper employee, age 35, was referred to Dr. Julius Friedenwald by Dr. Charles Maxson on January 16, 1930, for a digestive disturbance beginning two months previously and characterized by an epigastric discomfort occurring one-half hour after meals. The duration of the discomfort was variable, lasting sometimes for hours, and its relief by food or alkalies was not observed by the patient. However, when he was placed on a milk dietary regimen this symptom disappeared, but loss of weight followed. Five weeks before the consultation diarrhea was noticed. The stools were liquid in consistency and green in color. In addition to these primarily gastro-intestinal symptoms, there was also observed early fatigue and frequent palpitation, but the latter symptoms were of secondary importance in the patient's estimation. In the past history it was interesting that palpitation, occasional diarrhea, frequent urination (day and night) and "nervousness" had been present for many years. The family history was non-contributory.

On physical examination the patient demonstrated the striking exophthalmic goitre facies. He was somewhat underweight, but appeared well developed. His skin and mucous membranes were of good color; there were no petechiae and no evidence of jaundice. The eyes protruded; the pupils reacted to light and accommodation; the extra-ocular movements and eye-signs were normal except for the presence of a bilateral von Graefe. There was no nasal obstruction; the nasal septum was intact and the breathing space was good. The tonsils were small and hyperemic. The teeth were in moderately good condition; there was no evidence of caries or pyorrhea. The hearing was good; there were no aural tophi. The tongue was normal in every

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Fig. 1
Right leg, lateral view. The large tumor and four satellites may be observed.

way; the papillae were prominent. There were no buccal ulcerations; there was no sinus tenderness. The thyroid was symmetrically enlarged, rather firm, but not nodular. There was no thrill nor bruit over it. The pulsations in the neck were normal save for their rapidity. The trachea was in the midline. The chest expansion was good and the lungs were clear. There were no abnormal pulsations over the precordium. The rapid apex beat could be easily seen in the fifth left interspace, midclavicular line. The heart was not enlarged. The sounds were distinct, regular, and rapid. No murmurs were heard. There was no evidence of cardiac damage. The blood pressure was 156/76. The pulse was 126 beats per minute. There was no pulse-deficit. The abdomen was soft. The liver, kidneys, and spleen were not palpable. There was some tenderness in the epigastrium, but no other abnormalities. The extremities were not edematous; the calves were not tender. There were definite fine and coarse tremors of the extended fingers. There was no general glandular enlargement. The skin was moist. The reflexes were present, active and equal on both sides. The neurological examination was normal.

The urine was normal. The examination of the blood January 17, 1930, disclosed the following:

White blood cells	6,500
Red blood cells	4,608,000
Hemoglobin	85 per cent
Polynuclears	60 per cent
Small lymphocytes	27 per cent
Large lymphocytes	9 per cent
Eosinophils	2 per cent
Basophils	1 per cent
Monocytes	0

The red cells appeared normal.

A gastric analysis one hour after an Ewald test meal showed a total acidity of 88 degrees and free hydrochloric of 72 degrees. Mucus and bile were present. The stool was light brown in color, alkaline in reaction, and contained an increased amount of mucus but no blood, ova, or parasites.

Roentgen studies disclosed the following findings: the fluoroscopic examination of the chest showed both lung fields to be clear. Diaphragm movements were free and equal; the costophrenic sinuses were clear and no pleural changes were visible. The heart was of medium size, the pulsations regular and moderately rapid. The aorta was normal in width. The opaque barium meal passed freely through the esophagus into a medium sized stomach which demonstrated active peristalsis. The meal passed freely through the pylorus, the cap filled well and appeared normal. No filling defects nor irregularities were visible in either the stomach or duodenum. In six hours the stomach and small intestines were empty and the entire meal was in the colon. The head of the barium column was in the rectum. In 24 hours practically the entire meal had been evacuated; a trace only remained in the appendix. The colon presented a ragged outline and the barium had a stringy appearance, suggesting the presence of a colitis. The barium enema passed in freely and outlined the entire colon and terminal coils of the ileum. After evacuation the colon was empty with the exception of the sigmoid and rectum. The patient had a rather long appendix which drained poorly and was tender on deep palpation. The roentgen impression was that there was no evidence of an organic lesion in the stomach or duodenum; a possible chronic appendicitis; and colitis. Fluoroscopy of the chest was negative.

A basal metabolism test indicated a rate of plus 59

Fig. 2
Right leg, anterior view of tumor. Five of the six satellite growths are discernible. Note the "pig-skin" appearance of the skin over the large lesion.

Fig. 3
Left leg. The obvious edema of the skin is quite evident.

per cent. It seemed evident, therefore, that we were dealing with a definite hyperthyroid condition with exophthalmus; that is, a Basedow's syndrome. It was felt that the digestive symptoms were probably secondary to the hyperthyroid condition, but the possibility of ulcer was admitted in view of the clinical picture and gastric analysis, even though the roentgen ray findings were negative in that regard. At any rate, it seemed only reasonable to treat the obvious thyroid condition first. To that end the patient was hospitalized and prepared for operation by the usual measures, including the administration of Lugol's solution. On February 1 Dr. Maxson performed a subtotal thyroidectomy.

Pathological examination of the thyroid disclosed a typical colloid goitre.

The patient made a remarkable recovery, gained weight, but occasionally complained of an "empty feeling in his stomach" which was relieved by food. There was no pain. His blood pressure, however, was variable, reaching a maximum of 170/80; his pulse varied from 80 to 110. He continued to improve symptomatically and returned for examination on December 4, 1930. At that time he was feeling very well except for occasional spells of nervousness, and briefly his examination showed a healthy individual whose blood and urine were normal, basal metabolism plus 5.3 per cent and blood pressure 150/80. The exophthalmus was present, but the von Graefe had disappeared; the tremors were much less marked. On December 20 he was examined again. At that time his blood pressure was 120/80, the pulse 80, the weight 126½, and, curiously enough, the von Graefe had returned. When seen again ten months later (October 3, 1931) he weighed 119½ pounds, his basal metabolism was plus 10 per cent, his pulse 90, blood pressure 135/80, and there was present exophthalmos, a positive von Graefe, a tremor of the extended fingers, a definitely palpable but not particularly enlarged struma. His appetite, however, was poor. Despite these findings, he felt quite well. When last seen, on February 23, 1932, his basal metabolic rate was found to be plus 25 per cent, weight 132 pounds, and pulse 92.

The cutaneous manifestations appeared in April, 1931. He presented on the right leg at the juncture of the middle and lower third, anterior aspect, a tumor measuring 5 x 3 cm., faintly reddish in color, gelatinous in consistency, and translucent in appearance. The skin over the tumor was very thin and glistening. The tumor itself was not attached to the underlying tissues. Surrounding this large tumor were six pea-sized to bean-sized swellings, presenting all the characteristics

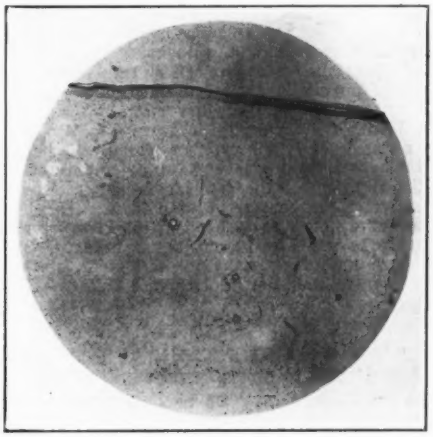

Fig. 4
Low power magnification of the section. Note almost total replacement of normal structures by the infiltrating mucinous substance.

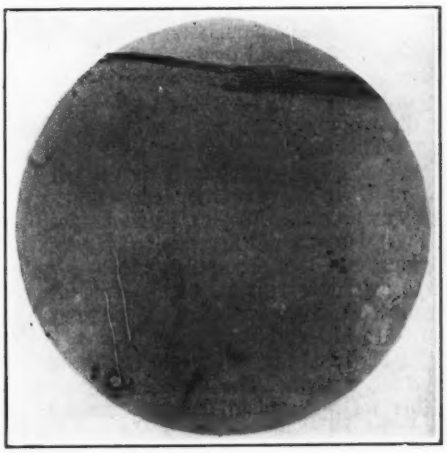

Fig. 5
High power magnification of the section.

of the larger lesion. On the left leg in the same position there was another tumor measuring 3 x 2 cm. with one pea-sized satellite growth. On incision for biopsy, the knife met practically no resistance, the tumor being of the consistency of very soft cheese. A small amount of glairy fluid oozed from the wound as well as from the section removed for study.

Microscopic examination disclosed the following: the hyperkeratotic layer was markedly thinned to almost total absence. The rete layer was also markedly thinned out, being in most places three or four cells in depth, with a complete flattening of all the rete pegs. The basilar layer was everywhere intact and one cell thick. There was in places considerable intracellular edema; otherwise, the rete was unchanged. The main changes noted in the section, as was to be expected, were in the corium. Here the collagen bundles were widely scattered, fragmented, and the bundles themselves seemed edematous. Blood vessels and glandular structures were practically absent. A few fibroblasts were seen scattered sparsely through the corium, mainly associated with the fragmented collagen bundles. There were no areas of lymphocytic or plasma cell infiltration, although there was some proliferation of the endothelial lining of the few blood vessels observed. Everywhere throughout the section marked edematous changes were noted, to such an extent in many areas that there seemed to be no tissue whatever. This amorphous infiltrating substance took no stain with hematoxylin-eosin, but stained red with muci-carmine.

DISCUSSION

The case has been presented in some detail, for it is desired to stress certain unique findings which we believe may be of importance in explaining the interesting relation of thyroid disease to localized myxedematous skin lesions. In our patient the symptoms were those of a digestive disturbance; its nature, clinically, was peptic ulcer, and as a matter of fact there was a satisfactory response to anti-ulcer measures. However, other symptoms and findings pointed definitely to a thyroid dysfunction, and the immediate response to thyroidectomy was remarkable, although strangely enough a colloid goitre was discovered instead of the expected toxic gland. This improvement was only temporary for, as noted, the patient later manifested some signs of thyroid overactivity even though the basal was normal. Further, at no time following thyroidectomy did he seem to be a "normal individual" in that his pulse, blood pressure, and to a lesser extent his basal metabolic rate, remained extremely unstable, the pulse varying from 80 to 120, and blood pressure from 120/80 to 170/80, basal metabolic rate from plus 5 to plus 25 per cent. The question arises as to whether we can explain the appearance of the skin lesion on the basis of an atypical thyroid dysfunction. It is certainly atypical, so atypical in fact as to be mistaken for a digestive disturbance and later to reappear with all its previous signs and symptoms except the increased metabolic rate. It may also be asked whether this is primarily a thyroid disturbance at all. Is it not rather an endocrine dyscrasia in which thyroid symptoms predominate? If it were primarily thyroid in origin, why the recurrence of symptoms, the peculiar masked symptomatology, and the appearance of skin lesions of myxedematous character?

The relationship of endocrine disturbances to skin changes is very vague. The pigmentary changes occurring in Addison's disease are well recognized. In ovarian diseases nail changes have been observed. Perhaps less well established is the relationship of growth of hair to the pituitary gland. The itching in diabetes is of course explained on the basis of disturbed sugar metabolism. In thyroid disease another association expresses itself, for in the presence of hyperthyroidism lesions develop in the skin which can be satisfactorily described as myxedematous. The cases are not numerous, but in the majority of instances the hyperthyroidism is atypical and usually it is a recurrent hyperthyroidism. If the disturbance is originally one of the endocrine system rather than one of the thyroid gland, then it might be said that the removal of that gland has excluded a factor only secondarily involved. This seems quite possible in view of the recurrences of thyroid disease, and the latter can be explained in some such manner as this: originally, the endocrine system is involved in a pathological change; the removal of the thyroid results in a readjustment of the endocrine mechanism, but the thyroid is not at fault, and as soon as the immediate temporary readjustment returns to its former state, symptoms reappear. The improvement, therefore, is due to an interference with the endocrine system at the wrong junction, and when the latter (the endocrine system) overcomes this interference the first disease reappears. Now, how does one explain the skin lesions on this basis? Again it seems that the thyroid symptoms are due either to a disturbance of the endocrine system as a whole or to some member of it other than the thyroid. Thyroidectomy removes a gland which was functioning satisfactorily and supplying the needs of the organism. The result of its removal may be cretinism, myxedema, "normal individual," or recurring hyperthyroidism. The first two rarely occur in this type of hyperthyroidism because the gland is still able to supply enough of its secretion to prevent them. However, it may not be able to prevent

them entirely and there may arise a localized myxedema about which more will be said shortly. One cannot expect a "normal individual" following thyroidectomy in these cases, because the gland originally was capable only of maintaining normality. This hypothesis assumes that the symptoms of hyperthyroidism in these cases are not produced by the thyroid gland. Recurrent hyperthyroidism may occur either because the causative agent, whatever it may be (adrenal, *etc.*), hypertrophies and becomes hyperplastic when the equalizing effect of the thyroid upon the endocrine system is removed or because the thyroid itself becomes a hyperthyroid. In any event an imbalance has occurred and the endocrine system temporarily is unable adequately to supervise the body's metabolism, and for some reason localized myxedematous areas occur in the skin of the legs of these patients.

Why should lesions appear in the skin? Why do they not appear elsewhere? We are unable to answer these questions at present. We may say, however, that the lesions may occur elsewhere, but we have not been able as yet to detect them. Furthermore, their obvious localization in the skin of the lower extremities may be associated with some circulatory change (as for example, O'Leary's cases), some trophic disturbance, or some "allergic" reaction in the skin at that site. All of these suggestions seem vague and theoretical at present, but they are quite substantial when viewed in the light of other so-called "trophic" and "allergic" phenomena. The uniform localization of allergic eczema, pellagra, trophic ulcers, etc., in expected sites is well recognized. Might not this localization on the lower portion of the legs, therefore, be some such mechanism?

Pillsbury and Stokes suggest that a long-standing cardiac edema was probably the precipitating factor in O'Leary's cases as well as their own. They thought the administration of thyroid aggravated the circulatory embarrassment which they felt was a potent agent in causation of the plaques.

Unlike the cases of O'Leary, our patient did not have a long-standing edema of his extremities of cardiac origin. He had no edema whatsoever, and his heart was well compensated; it gave no evidence of damage. Since our case had no cardiac embarrassment, this explanation cannot hold in all instances. In our case the instability of pulse, blood pressure, von Graefe, tremors, and so on, persisting after thyroidectomy, all gave evidence of an existing uncured disease which we believe is probably not primarily a thyroid disturbance. It is to be remembered that histological examination of the thyroid showed only a colloid goitre.

Since, in the great majority of cases the localized myxedematous patches occurred in patients who had had a thyroidectomy, one wonders what would have happened had the operation not been performed. It seems reasonable to assume that no skin lesions would have appeared. It is the disturbance to the endocrine system caused by a break in the chain, that is, a thyroidectomy, which in some way causes their appearance.

Are the lesions really in the nature of myxedema or is that term a misnomer? O'Leary avoids the expression "localized myxedema" because he believes "the term myxedema is now, because of common usage, applicable to the group of constitutional symptoms which develop as a result of hypofunctioning of the thyroid gland and of which the cutaneous manifestations are merely a coincident phase." Pillsbury and Stokes, on the other hand, "favor the retention of the term circumscribed myxedema" because they believe "it is apt, descriptive, and historically correct." To us the term "circumscribed myxedema" is acceptable because histologically the lesions are as characteristically myxedematous as in constitutional myxedema. Objection may be raised to the use of the term localized myxedema in a hyperthyroid individual, but we see nothing wrong in this since these are precisely the conditions which seem to coexist in this curious syndrome.

Perhaps Crile's ideas concerning the thyroid, the suprarenals and other endocrine glands and their relation to peptic ulcer and thyroid disease may be substantiated to some extent by our case. Not only have we the picture of a peptic ulcer (except by x-ray), but it seems to us that there is definite evidence that the thyroid is only one factor in a system (endocrine) disturbance. Whether removal or denervation of an suprarenal would have been a more helpful operation is conjectural. The fact that the skin lelions ultimately disappear may be evidence that their disappearance depends upon the resumption of a normal endocrine regulatory mechanism rather than upon the form of therapy employed.

SUMMARY

(1) A case of circumscribed myxedema of the extremities in association with recurrence of clinical symptoms of hyperthyroidism in a pre-

viously thyroidectomized individual is presented.

(2) The question as to whether the thyroid *per se* is at fault in this association or whether the disease is one of "endocrine system" disturbance is raised.

(3) While definite conclusions cannot be derived from one case, suggestions and theories as to the strange mechanism which would produce areas of myxedema in a patient suffering from apparent hyperthyroidism are advanced.

REFERENCES

1. O'Leary, P. A.: Arch. Derm. & Syph., 21:57, 1930.
2. Pillsbury, D. M.; and Stokes, J. H.: Arch. Derm. & Syph., 24:255, 1931.

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DISCUSSION (*Abstract*)

Dr. Fred D. Weidman, Philadelphia, Pa.—One phase of localized myxedema which has not been covered by the dermatologist is its chemistry. The particular kind of mucin concerned in generalized cases is known as paramucin, which can be very easily identified because it reduces Fehling's solution after preliminary hydrolization by weak mineral acids. It is appreciated that sufficient quantities of material are not likely to be available for such tests, but if the occasion should arise, it should be taken advantage of.

When appraising the role of the thyroid in Dr. Lord's case, and particularly where a problem was involved in the presence of colloid rather than toxic goiter, the possible role of accessory thyroid should receive consideration. It is most unlikely, however, that an accessory thyroid could be "toxic thyroid" without the main organ itself showing the same kind of change.

As far as I know, the thyroid is the only gland which has ever been referred to as the agent in generalized myxedema, and inasmuch as our knowledge of localized edema is patterned from analogy with the generalized form, I feel that we should go slowly in attempting to draw in other glands of internal secretion. With generalized myxedema such a long established entity, and so widely and thoroughly studied by internists and pathologists, it seems curious that interrelationships with other endocrine organs, if existent, should not have become established long ago in connection with the generalized form of the disease.

Dr. Garold V. Stryker, St. Louis, Mo.—During hyperthyroidism toxins are produced in excessive quantities and at the same time those cells which produce normal thyroid secretions tend to become exhausted. This results in a lessened amount of those secretions which are necessary to maintain normal cellular activity. There is created an actual want of normal secretion. The institution of surgical procedures causes a sudden diminution in the supply of both the toxic secretions and the already diminishing amount of normal secretion. There is, therefore, a sudden rise of those substances which produce myxedema and a corresponding sudden fall in those which prevent the development of myxedema. In the interval in which the thyroid gland and the tissues of the body are adjusting themselves, in an attempt to establish an equilibrium, there are periods in which the balance sways first to the side of myxedema and then to the normal. During this period of fluctuation areas of circumscribed myxedema appear.

It is not unreasonable to suppose that trauma plays a part in fixing the localization of the plaques such as are found in this disease. The lower half of the legs, particularly the anterior surface and the region over the tibia, are frequently traumatized. This trauma may occur as the result of physical blows which impair the cells or may result from the presence of varicose veins, from an edema associated with cardiac disorders or from previous pathological conditions. The last two conditions mentioned were present in cases reported by O'Leary. In one case the plaques of myxedema were limited to the areas which had formerly been the site of lesions of erythema induratum.

Trauma, regardless of the cause, results in inflammation. At the sites of inflammation the capillary pressure is increased. From this it follows that osmotic pressure is altered and a sufficient quantity of mucin producing substance may be permitted to escape into the tissues, or the amount of mucin inhibiting substance in the skin may be lowered. This supposition would account for the presence of circumscribed myxedema.

Any attempt to explain the occurrence of these curious lesions must be based entirely upon theory with very little to substantiate it. This lack of knowledge places any theory in the category of pure speculation and renders all attempts to explain circumscribed myxedema particularly difficult.

Dr. Lord (closing).—One point which both our paper and the present discussion brings out to me is the fact that we are still in the realm of pure speculation in any attempt to clarify the peculiar interrelationship which occurs in this unusual syndrome.

Dr. Stryker and Dr. Weidman apparently overlooked one important factor in mentioning their possible theories as to the causation, namely: that the lesions did not develop until after symptoms of recurrent hyperthyroidism had become apparent. There is no doubt that removal of portions of the thyroid gland will reduce the remaining normal secreting cells considerably in number as well as the toxic cells. In our case, however, there were no toxic cells, the gland being, as mentioned before, a purely colloid goiter. We must in our case, therefore, look further than the thyroid gland for the etiological factors in the production of our patient's original condition. It seems doubtful to me that he had an accessory thyroid, particularly in view of the marked improvement which the operative procedure temporarily produced.

As Dr. Stryker brings out, trauma may very readily play a part in the production of this curious syndrome, but we must rule out, at least in our case, the possibility of cardiovascular disease, either varicose veins or cardiac damage, inasmuch as our patient presented neither of these.

The parallel between generalized myxedema and circumscribed myxedema cannot here be drawn because we are again dealing with a different picture. Generalized myxedema appears in individuals whose thyroid gland is insufficient, due either to disease of the gland or as a result of the removal of too large a quantity

of the gland operatively. In our case, as stated before, we have symptoms of overactivity and localized lesions which present characteristics of under-activity.

In conclusion, let me say that more cases must be observed and further work done before we can hope which present characteristics of underactivity.

SPASMODIC TORTICOLLIS*

NOTES UPON ITS ETIOLOGY AND TREATMENT

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Spasmodic torticollis is a rare affliction characterized by repeated attacks of spasmodic contractures involving the muscles of the neck. In true spasmodic torticollis, there are few resemblances to the other varieties of torticollis, either in symptomatology or pathological anatomy.

The onset of the disease is, as a rule, insidious. At first, the only complaint may be that of stiffness or a drawing sensation in one side or back of the neck. Such symptoms are usually followed in a short while by a momentary pulling of the head to one side. Usually these symptoms are exaggerated during periods of excitement and disappear during relaxed moments. At first, the patient can voluntarily correct the position of the head or restrain the spasm by supporting the head with the hand, or by overcorrecting the head in the opposite direction. After a time, however, the convulsive spasms become uncontrollable, even interfering with sleep. Eventually, these symptoms become so pronounced that the patient may be totally incapacitated, not only from the muscular fatigue resulting from the spasms, but from chagrin at the attention attracted to himself by his uncontrollable antics. In severe cases, other groups of muscles also may become involved, those of the shoulder and arm and those having to do with phonation and deglutition being the most common.

This bizarre affliction has intrigued surgeons for almost 300 years, the first attempt at surgical treatment being reported by a German army surgeon in 1641. Finney and Hughson,[1] in their classic article, give an interesting historical survey of the surgical treatment of this disease. It was not until 1891 that W. W. Keen devised the first logical and complete operation for the relief of spasmodic torticollis. He advocated bilateral section of the first three cervical nerves and the spinal accessory nerve in the neck. Apparently, he was one of the first observers to appreciate fully the fact that in severe spasmodic torticollis all of the muscles of the neck are involved. Failure to recognize this fact is probably responsible for the many abortive surgical procedures which have been proposed for the relief of this condition.

Our knowledge as to the etiology of spasmodic torticollis is hopelessly inadequate. Innumerable theories have been advanced, most of which are purely fanciful and lacking in scientific proof. The theory which has received the most widespread support is that the disease is psychogenic in origin. Clark[2] describes the mental type of spasmodic torticollis and evolves the theory that "the eventual constitutional defect is one of emotional infantilism." He considers these patients as being indecisive, vacillating and erratically unstable persons. Psychogenically, they suffer emotional fixation in their daily lives. Following this line of reason, many cases have been treated by psychoanalytic methods. A few favorable results have been reported. While most writers decline to accept the psychogenic theory as being applicable to most cases, they do admit that there is a pronounced neurotic or psychopathic element in a great majority of these patients. However, they are inclined to consider the functional element as secondary to a more profound organic disturbance.

The infection theory of spasmodic torticollis has received wide support. An interesting experiment is reported by C. W. Mayo,[3] in which the tonsils and teeth were removed from a typical case. Rosenow made cultures and suspensions from the material expressed from the tonsils and teeth. He injected three rabbits in the right cerebral hemisphere with this material. The rabbits, several weeks later, developed symptoms which simulated those of spasmodic torticollis. Cultures from this same material showed *Streptococcus viridans*. No confirmation of this observation is to be found in the literature. Rynearson and Woltman[4] report the result of treatment of 247 cases of spasmodic torticollis by medical measures, consisting chiefly of removal of all possible foci of infection. They were able to relieve completely 16 per

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cent of their patients by medical treatment alone.

That the disease is due to a lesion in the brain or in the cervical cord has been advanced by many authors.[1] No proof as to the nature of the lesion has been forthcoming, some believing it to be infectious and others believing it to be vascular in origin. In support of the belief that the lesion is a central one is the fact that spasmodic torticollis frequently appears as a sequel of encephalitis and chorea.

There are others who believe that the lesion lies in the peripheral nerves, and several observers[5] have made extensive pathological studies of nerves removed at operation from typical cases. The results of these studies have been inconsistent and inconclusive.

Some writers[1] attribute the condition to occupational strain. Others[6] believe that the source of the trouble is to be found in certain changes affecting the cervical vertebrae.

From the above random review of the various theories as to the etiological factors concerned in spasmodic torticollis, it becomes apparent that we know next to nothing of what causes the disease. Unfortunately for the progress of our knowledge, very few cases die of this malady. In fact, we were able to find only one record of an autopsy on a typical case in the literature. This case showed little but degenerative changes involving the posterior column of the cervical cord.

We shall add one more bit of evidence in support of the infectious theory. The first case, which is reported in detail at the end of this paper, showed definite evidence of an old inflammatory lesion involving the pia-arachnoid of the cervical cord and the brain stem. When the cord was exposed at operation, the pia-arachnoid was found to be greatly thickened not only over the surface of the cord itself, but around the nerve root as well. The pia-arachnoid had a granular appearance like that seen in chronic cystic arachnoiditis. The clinical history in this case failed to disclose a former illness which might have been responsible for these findings. The second case which we shall report gave a definite history of epidemic encephalitis four years prior to the onset of the symptoms of torticollis and presented on clinical examination certain stigmata which are characteristic of that disease. Yet, no evidence of a former inflammatory lesion of the meninges over the cervical cord or brain stem was found at operation.

TREATMENT

We shall consider only the surgical treatment of this disease. While it is true that there are many reports in the literature commending the treatment of psychoanalysis and medical measures, yet these reports have been, on the whole, unconvincing.

There are cases in which the spasmodic contractures seem to be sharply limited to one sternocleidomastoid muscle or perhaps one sternocleidomastoid and one trapezius muscle. While cases of this sort are rare, yet they do occur, and a unilateral section of the spinal accessory nerve may affect a cure. We have seen one example of this type, and after section of the spinal accessory nerve on the affected side, the patient has remained comparatively free of symptoms for nearly three years. Judging from reports of other authors, it would seem that the improvement is likely to be temporary only, as the spasmodic contractures soon develop on the opposite side or in the other muscles of the neck on the same side.

Believing, as we do, that all of the muscles of the neck are involved in severe cases, nothing short of the radical operation will suffice to relieve the symptoms. This attitude is the one held by the majority of surgeons who have written in recent years upon the treatment of this malady. The Keen operation, as described at the beginning of this paper, forms the basis of treatment now generally employed. Finney and Hughson,[2] in 1925, described an operation which is a great improvement upon the original Keen procedure. It consists of sectioning the first three cervical nerves and the spinal accessory nerve bilaterally, also the division of most of the posterior neck muscles attached to the occipital bone. Their results in a series of 32 cases were highly satisfactory.

McKenzie,[7] in 1924, reported from Dr. Cushing's clinic the intradural section of the first, second and third cervical nerves and the spinal accessory nerve on one side for the relief of a severe case of spasmodic torticollis. In this report, a statement by Dr. Cushing indicated that as early as 1902 he had performed an intradural section of the first and second cervical nerves in the treatment of a case of this disease.

Coleman,[8] in 1927, reported the first case in which the first four cervical posterior roots on both sides were sectioned intradurally. He resected the spinal accessory nerves in the neck at the secondary operation. The result in his case was highly satisfactory.

Since McKenzie's report appeared, neurosurgeons generally have adopted the intraspinal operation as the method of choice. A fairly large series of cases treated by this means have accumulated in the literature. The result when analyzed would seem to have been more satisfactory than by any other procedure heretofore employed.

The only variation in the technic of the intradural operation is that some authors advise cutting the spinal portion of the accessory nerve intradurally, while others prefer to section the nerve in the neck. We believe that the operation can be performed safely by division of all the nerves, namely, the first three cervical anterior and posterior roots and the spinal portion of the accessory nerve intradurally. Thus, the entire procedure can be completed in one session through one operative incision. It is unnecessary to remove a part of the occipital bone as originally advised by McKenzie in order to section the accessory nerve. Inasmuch as we are concerned only with the spinal portion of the nerve, it can be divided easily through the dural incision at the level of the foramen magnum. It is unnecessary to section the cerebral portion of the accessory nerve, since it plays no part in the disease.

The technic of the operation which we have employed is as follows: an incision is made in the midline from the occipital protuberance to the spinous process of the fifth cervical vertebra. The muscles and periosteum are freed from the spinous processes and the base of the occipital bone. The laminae of the upper three cervical vertebrae are removed. The dura mater is opened in the midline over the first three cervical segments and continued upward to the rim of the foramen magnum, care being taken to avoid the cerebellar dural sinus. The posterior and anterior roots of the first three cervical nerves are identified and sectioned. It is not uncommon to find the posterior root of the first cervical nerve absent. The filaments of the spinal portion of the eleventh nerve are identified between the posterior and anterior cervical roots. At the point where these fila-

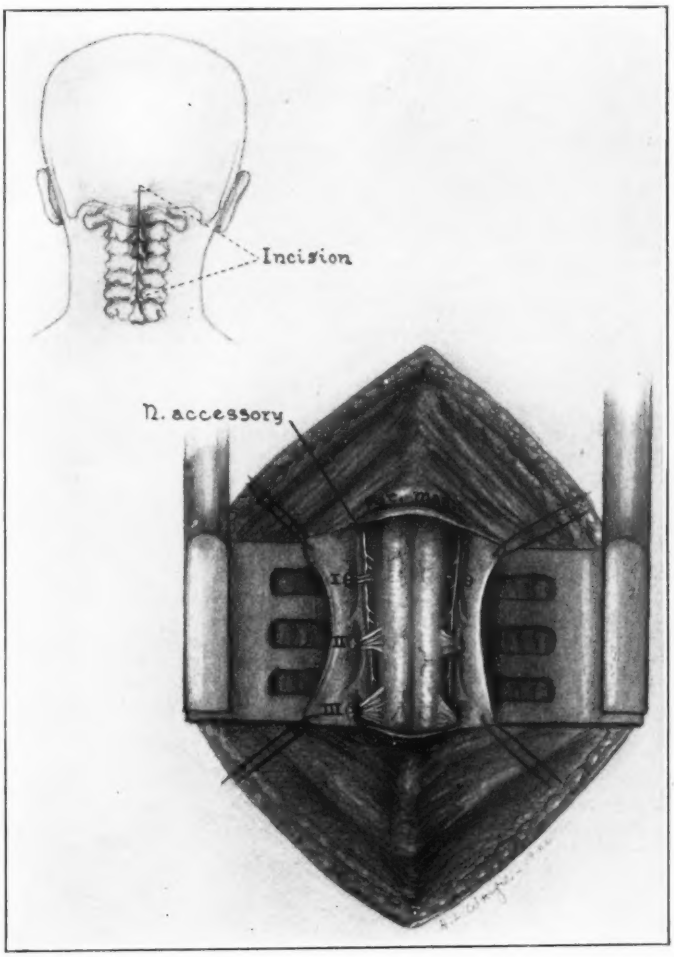

Fig. 1

Drawing of the operative field in Case 2. First, second and third posterior roots are shown on the left side. On the right side, the first posterior root is absent. The trunk of the spinal portion of the accessory nerve is shown bilaterally. Insert shows line of skin incision.

ments unite to form the spinal portion of the accessory nerve, a small artery is usually seen. Before cutting the nerve, silver clips are applied to include the artery as well as the nerve trunk. If this precaution is observed, troublesome bleeding from the small artery will be avoided. The dura and the muscles of the neck are closed in layers with interrupted silk sutures (*Fig. 1*). No restraining dressing is applied, but for the first two days the patient's head is kept immobilized with sand bags. Afterwards, the patient may be turned from side to side. After ten days, he is encouraged to support his head while sitting in bed, and after two weeks, he is placed in a chair and encouraged to start active motion of the neck muscles.

Convalescence in the two cases which we have treated by this method has been rapid and uneventful. Spasmodic contractures disappeared immediately following the operation. At first, the patient will complain of considerable difficulty in supporting the head. In both instances the patients have been able to walk around with little or no discomfort after four weeks. In the first patient, upon whom we operated eight months ago, the weakness and fatigue of the neck muscles have entirely disappeared, although he still recognizes the fact that movements of the head and neck are limited considerably.

The choice of which radical operation should be used in the treatment of severe spasmodic torticollis seems to us to be one of individual preference, because both the Finney operation and the intradural operation seek to accomplish the same end. We believe that the intradural operation is by far the simpler procedure, provided the operator is accustomed to intraspinal operations. The mortality for either operation should be practically nil. It seems to us that there is more likelihood of missing important nerve roots by the Finney operation than by the intradural approach. There again, such a contingency would depend largely upon the skill and experience of the individual operator. When the Finney operation is employed, there is always the possibility of regeneration of the nerves after section outside the spinal cord. This possibility does not occur when the nerves are sectioned intradurally.

CASE REPORTS

Case 1.—T. A. M., a white man, aged 58 years, was referred by Dr. John Moren, of Louisville, Kentucky. The patient is a small town merchant, living in quiet surroundings with his wife and two children. His general health was good until about 3 years previously, when he first noticed a spasmodic jerking of the muscles of his neck with pulling of his head to the right.

About 6 months before we saw him these spasmodic contractures became decidedly worse. His head was drawn to the right and backward. They occurred during sleep. The usual medical treatment was instituted without relief. Three months before, the left sternocleidomastoid muscle was sectioned at the sternoclavicular attachment, yet the contractures continued to increase in severity.

He had been under unusual business strain for the preceding 6 months, coincident with which the spasmodic contractures increased in severity. He considered himself completely incapacitated and felt that with the present affliction life was not worth living.

The general physical examination was negative except for a severe vascular hypertension, the cause of which has never been found (blood pressure 220/120).

The neck musculature was in a constant state of contracture, displaying fibrillary twitchings, group spasms and severe clonic and tonic spasmodic contractures. Excitement decidedly increased the activity of the process. There was no regularity to the pattern of the contractures; a severe spasm might start immediately or be the end-result of lesser contractures. He always tried to steady his head by placing the left hand to his left frontotemporal region and his right hand on the right occiput. These severe attacks often repeated themselves two or three times. Relaxation occurred, but lasted only a few minutes until the whole process repeated itself.

Operation January 26, 1932.—The left spinal accessory nerve was sectioned through an incision posterior to the sternocleidomastoid muscle. On February 1, 1932, an intradural section of the first, second and third cervical anterior and posterior roots was performed. The spinal portion of both spinal accessory nerves was sectioned intradurally.

The convalescence was normal. He was able to move his head after two or three days. He sat up in a week and began walking three weeks postoperatively. Active and passive exercises were employed regularly with benefit. There was no muscular twitching. He was discharged from the hospital on February 26, 1932.

On three subsequent visits to the office, the patient had improved in general strength and had a much improved control of the motion of his head.

Case 2.—S. J., a school girl aged 18 years, was referred through the Kentucky Crippled Children's Commission for relief of spasmodic movements of the head and neck.

The family history is irrelevant. The past history is irrelevant except for an attack of "sleeping sickness" 7 years before with lethargic symptoms lasting for 3 weeks. Following this illness, she was always considered to be a "weakly child," although there were no serious febrile disturbances during this interim.

Three years previously, the jerking movements of the head were first noted. These were present at first only during periods of excitement, the head always jerking toward the left side. At first, she could control the jerking by placing her hand under her chin, but within a few months any effort on her part to control these movements caused them to become exaggerated. For the previous 6 months, she had been unable to continue school work or indulge in social activities because of the spasmodic jerking movements. Also, during the preceding 6 months, the shoulder and right arm had taken part in the spasmodic contractures.

Her high school teacher accompanied her to Louisville and explained that the child was unusually bright in her studies, and were it not for the fact that study was impossible during school hours due to these spasmodic movements, she would stand near the top of her class.

The spasmodic movements had never been observed during sleep.

The general physical examination was essentially negative except for the spasmodic contractures of the neck and right shoulder. Her face was expressionless and suggestive of a residual manifestation of the supposed attack of encephalitis 7 years before. She constantly assumed an attitude in which the chin was drawn downward to the left with the right shoulder elevated. The paroxysms of jerking occurred every 2 to 3 minutes, lasting 30 to 60 seconds, following which there was a period of relaxation. The right sternocleidomastoid muscle was tremendously hypertrophied and the convulsive movements were easily observed through the skin. With each paroxysm the entire group of posterior neck muscles and the right trapezius went into spasmodic contractures. The right shoulder was elevated during each paroxysm. At the height of each spasm the chin was pointed toward the left shoulder and pulled downward.

Operation September 28, 1932.—Bilateral section was done of the first three anterior and posterior cervical roots and the spinal portion of the accessory nerve intradurally.

The convalescence was uneventful. Immediately following the operation, the convulsive movements of the neck muscles and shoulders ceased. On the tenth postoperative day voluntary movement of the neck was started. On the fourteenth postoperative day the patient was out of bed and had started to walk about. At first the support of the head was weak, and she had difficulty in straightening the head when forcible flexion or extension was made. This was soon overcome, and four weeks postoperatively she was able to perform all movements of the head in a somewhat restricted manner. She was discharged from the hospital free of all spasmodic contractures of the neck muscles.

SUMMARY

(1) Spasmodic torticollis is a rare affliction characterized by repeated attacks of convulsive spasms involving the muscles of the neck.

(2) The etiology of the condition is obscure.

(3) The various operative procedures employed for the relief of spasmodic torticollis are discussed in detail. We recommend the intradural section of the first three anterior and posterior cervical nerve roots and the spinal portion of the accessory nerve bilaterally.

(4) The details of two severe cases thus treated are reported.

BIBLIOGRAPHY

1. Finney, John M. T.; and Hughson, Walter: Arch. Neurol. & Psychiat., 81:255-268, 1925.
2. Clark, L. Pierce: Med. Rec., 92:48-54, 1917.
3. Mayo, C. W.: Proc. Mayo Clinic, 2:270, 1927.
4. Rynearson, Edw. H.; and Woltman, Henry W.: Amer. Jour. Med. Sci., 183:559-562, 1932.
5. Byrnes, Chas. Metcalfe: Johns Hop. Hosp. Bull., 34:125-128, 1923.
6. Bezi, Istvan: Arch. Path., 12:333-357, 1931.
7. McKenzie, K. G.: Surg., Gyn. & Obst., 39:5-10, 1924.
8. Coleman, C. C.: Virg. Med. Quart., 53:761, March, 1927.

DISCUSSION (*Abstract*)

Dr. C. C. Coleman, Richmond, Va.—The treatment of spasmodic torticollis has reached a much more encouraging stage, with the employment of surgical procedures designed to abolish contraction of the neck muscles by a direct attack upon the innervation of the muscles. Dr. Spurling has discussed in his paper the widely varying views as to the etiology of the condition. I think that he is undoubtedly justified in believing that painful spasmodic torticollis has an organic basis, probably of central origin. The opinion that the condition is a neurosis is losing ground, due largely to the fact that it is being relieved by surgery. It appears to me at the present time that the important thing is to so classify the cases that those who have widely diffused athetoid movements associated with or overflowing from the contraction of the neck muscles be not subjected to operation, which in such cases is likely to be a failure.

We have found in operation upon ten patients since 1926 that the likelihood of a cure by operation appears to be in proportion to the predominance of the tonic contraction in the deformity. We have likewise found that the best results by operation have been gotten in those patients who do not tolerate fixation of the head with a cast.

In 1926, following the suggestions of McKenzie and Alfred Taylor, I did what is, so far as I know, the first bilateral intradural section of the spinal nerve roots for relief of this condition. This case was reported at the meeting of the Southern Surgical Association in December of that year. In this operation I divided the four upper posterior roots and the right spinal accessory nerve extracranially. The results were excellent and the patient, who had been previously unable to work, or even shave himself, went back to an active occupation as traveling salesman.

Since my first case in which the intraspinal operation consisted of section of the four upper posterior cervical roots only, I have added section of two or three upper anterior roots, as used by Dr. Spurling. We have not in every case divided the same number of anterior roots on both sides, and we believe that the extent of the section, in so far as the anterior roots are concerned, may be varied according to the type of contraction and the muscles involved. In the case without satisfactory improvement, the three upper cervical roots were divided on both sides, as well as the four posterior roots, along with the extracranial division of the spinal accessory on one side. We have never divided the spinal accessory intracranially, because cases of paralysis of the vocal cords have been reported, and division of the nerve where it enters the sternomastoid muscle can be done under local anesthesia, and should be done before intradural division of the nerve is undertaken.

One will sometimes find after a radical, though safe operation, such as Dr. Spurling has used, that there is a residual of the contraction and unsteadiness of the head, which may be removed by additional peripheral sections of the nerve supply to those cervical muscles with persisting contraction. In none of our cases

has the maximum good result of operation been attained under six months, and we have routinely informed the patient of what he may expect as to the length of time required for satisfactory improvement.

Dr. Spurling's discussion of the results in his 2 cases further emphasizes the encouragement which the intraspinal nerve section should give to the disabled and unfortunate victims of painful spasmodic torticollis.

A FAMILIAL DISEASE OF THE CENTRAL NERVOUS SYSTEM RESEMBLING MULTIPLE SCLEROSIS*

PRELIMINARY REPORT

By R. FINLEY GAYLE, JR., M.D.,†
and
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Our interest was aroused several years ago in the familial aspect of disseminated sclerosis, by reason of the fact that we diagnosed the disease in an elderly man, who stated that every member of his immediate family, and many antecedents, were similarly affected. Although little is generally known by medical men or neurologists concerning the familial or hereditary tendency of multiple sclerosis, there has been reported a fairly large series of cases since 1890, at which time Leuch first reported this collection.

There is little doubt that disseminated sclerosis has a familial tendency, even though the occurrence is relatively rare. There have been a number of observers who have reported series of cases of disseminated sclerosis occurring in families, some of which have been proven at autopsy. Several authors, however, in reporting the familial aspect of this condition raise the question of the diagnosis of others, particularly those who reported the disease in very young children, without autopsies. Certain of these cases appear to us to resemble more nearly the family cerebral diplegias of childhood than typical disseminated sclerosis.

Cestan[1] refused to report several of his cases in children, without autopsy, because of the absence of cerebral symptoms of disseminated sclerosis and the possibility that the condition was a familial diplegia. Mueller,[2] in 1904, expressed the belief that multiple sclerosis does not have a family or hereditary basis, and stated that he knew of no recorded cases of the family hereditary type. He reviewed all the reported cases up to that time, including those of Eichhorst[3] and Leuch,[4] which were then the most frequently quoted examples of the familial type of multiple sclerosis. Wechsler,[5] in the latest edition of his very excellent textbook on nervous diseases, states that "Heredity plays no role at all." Sir William Gowers[8] writes concerning this question, "Direct heredity, or the affection of two brothers or sisters, has been noted in a few instances, but it is quite exceptional." Risien Russell[7] believes that "It has only happened exceptionally that any direct hereditary connection has been traced, or that more than one member of a family has been affected." E. W. Taylor[8] states: "It is most rare to find instances of disseminated sclerosis running in families."

Davenport,[9] on the other hand, avers: "Whatever may eventually be proven as to the cause of multiple sclerosis, the fact of heredity cannot be left out of account. Whether we have to do with multiple sclerosis as two diseases, one of which follows an inflammation and degeneration of the nerve sheath and the other of which is a primary hyperplasia of the glia, is uncertain. Just as neurofibromatosis is hereditary, so the latter type of multiple sclerosis might well be, but the former less definitely so. Curschmann,[10] in 1920, writes: "By far and away the commonest condition of recurrence of the disease in the family is the fact that two or more persons are of the same paternity." It seems most probable that such familial distribution as multiple sclerosis does show is dependent upon hereditary factors.

It is generally accepted that multiple sclerosis is a disease occurring between the ages of twenty and forty. A number of cases have been reported in children and a smaller number in elderly people. There is some difference of opinion as to the age of onset. Dana[20] says that the disease does not occur in the declining years of life, and he also states in the same publication that he does not believe in the hereditary influence. Neustaedter[11] and others state that multiple sclerosis does, in rare instances, begin late in life. Wechsler[12] says that the disease occurs at all ages, from early infancy to old age. Crocq[13] (quoted by Jelliffe) reported one case the initial symptoms of which occurred at 81 years of age. In no other records are we able to find mention of cases beginning after sixty years of age. Jelliffe[14] reports that 18 per cent of his

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cases began between the ages of fifty and sixty years.

We wish to call your attention to the following collection of cases of familial disseminated sclerosis, which are all we have been able to find after a careful survey of the literature. The first recorded instances of the family-hereditary type were reported by Leuch,[4] in 1890, and by Eichhorst[3] in 1896.

In Leuch's series, a mother who had disseminated sclerosis when pregnant, bore a child who remained well until the age of seven, when symptoms of multiple sclerosis were noted. The child eventually died of the disease. In Eichhorst's cases, a mother and her son, aged eight, were both subjects of the disease. Cestan[1] and Guillan, in 1902, described a case of a boy fifteen years of age with paresthesias, highly exaggerated knee and ankle jerks, positive Babinski, but no speech or macular defects or intention tremors. They refused to report this case until they had had autopsy studies, which confirmed their opinion. This boy's father and elder sister presented identically the same symptoms, although postmortem findings were not published in these two cases. Brissaud,[15] in 1902, reported two brothers who had disseminated sclerosis, on whom autopsies were done. In 1904 Reynolds[21] reported two families in which there was disseminated sclerosis. In the first family the father died of suicidal melancholia. A male first cousin of the father's was supposed to have had disseminated sclerosis at the time of the report. The mother of the patient was well. There were six brothers and sisters, three of whom, the second a girl and the fourth and sixth males, had multiple sclerosis. Of the other three, the first child, a male, was well. The youngest child, a girl, was in an asylum with melancholia, and the third, a female, suffered with periodic sciatica. The onset of symptoms in this group was at the usual age period of the disease. In the second family the antecedent history was negative. Of three children, all female, the oldest and youngest, aged twenty-nine and twenty-five, respectively, had multiple sclerosis, developed at the ages of twenty-five and fifteen, respectively. In 1908, Abrahamson[16] reports two brothers in a family of three, affected typically with disseminated sclerosis. Except for neuropathic tendencies in the family, the history was negative. Batten[22] reports briefly in 1909 two members of the same family, aged twenty-seven and twenty-five, who were two of six children developing the typical clinical picture of disseminated sclerosis. There was no history of disease in the antecedents. Weisenberg,[17] in 1909, reports the history of a mother and daughter who had typical cases of disseminated sclerosis, and of another brother in the family, not examined by him, who had similar symptoms. Corial,[18] in 1909, recorded four cases in children, only two of which occurred in the same family. The disease entity, from his description of it, resembles more nearly cerebral diplegia or Schilder's disease. Krabbe,[19] in 1916, in a paper entitled "A New Familial Infantile Form of Diffuse Brain Sclerosis" cites cases with a familial feature in children, which begin about the fifth month in childhood, pursuing a chronic course and ending with death at about the fifth or sixth month after the onset. In these cases there was a universal rigidity of musculature, violent tonic spasms, nystagmus and atrophy of the optic nerve, which picture is rather typical of encephalitis pariaxialis diffusa.

Since all of the cases observed by us have been almost identical in history, onset, course and physical findings, we will report only one of them in detail, and the others in tabular form. Spinal fluid examinations were made on three of the five patients and were found to be entirely negative. The other two patients were too old and feeble to be subjected to such treatment. The routine blood examinations were normal, and blood Wassermanns were negative in all cases.

G. F. B., a white man of sixty, a merchant, was admitted to the McGuire Clinic on October 12, 1927, complaining of "locomotor ataxia," stiffness, with loss of use of legs, and vertigo with some nausea. The family history was negative save for the frequent incidence of a similar neurological condition throughout several generations. This phase of the case will be taken up in detail later in this paper. The past history revealed nothing of significance. He had been remarkably healthy all his life, had worked hard, and enjoyed it.

The onset of the patient's present trouble was insidious, manifesting itself at about the age of fifty, as a slight stiffness, without pain, in the muscles of his legs, together with increased fatiguability. He stated that this stage of his condition would probably have passed unnoticed had he not been on the lookout for it, since the malady had been common in his family for generations, and had already disabled each of his older brothers and sisters. There had been no paresis, but he had had attacks thought to be renal colic, for which he had to have hypodermics of morphia. These attacks had never been associated with frequency, urgency, or dysuria, and he had never passed blood, stone or gravel. For the previous four years he had had none of these attacks, but had had night and day frequency of urination, with a small stream and some dribbling. He frequently had to strain for several minutes before the stream would start.

His muscular disability became gradually worse, and

ataxia began to manifest itself in stumbling and staggering, six years previously. He was not able to walk in the dark without support, and walking down steps was especially difficult. If he sat for any length of time he required support in arising, and if he tried to hurry in walking he lost control of his legs, and often stumbled and fell.

Eighteen months previous to his examination there had been increasing difficulty in enunciation, until, at the time of his examination, even simple words caused much effort, and were poorly produced. He stated that he frequently saw double, and that his vision for distant objects was always blurred "unless he shut one eye." His hearing was normal, but a short time before he had noticed vertigo and nausea on looking upward. Deglutition was normal.

He had noticed a gradually increasing memory defect for recent events, especially for proper names, although his memory for remote happenings was still as clear as ever. So far as he or his family were able to discern, there had been no change in his mental ability, and his business judgment was sound. Although he was reasonably concerned about his condition, he had been emotionally stable, and not unduly depressed. His attitude towards his disability had been about that of a normal person towards old age, with its many infirmities. His statement that, "Most all of my family have it if they live long enough," is a good illustration of his viewpoint.

His general physical examination was normal save for marked generalized arteriosclerosis, with a blood pressure of systolic 180, diastolic 90. There was a moderate tenderness over the urinary bladder. Findings on neurologic examination were as follows:

(1) Argyll-Robertson pupils.

(2) Eyegrounds showed moderate arteriosclerosis and temporal pallor of the optic discs. There were several pigmented areas in the right fundus, suggesting early retinitis pigmentosa.

(3) Moderate hypermetropia, but normal vision with correcting lenses. No contraction of visual fields for either color or form, and no scotomata were found.

(4) There was no ptosis nor strabismus, but there was nystagmus associated with nausea on looking upward.

(5) Hearing and coloric tests were normal.

(6) Other tests of cranial nerve function gave normal responses.

(7) *Motor.*—(a) There was generalized increase in muscle tone, with involuntary resistance to manipulation and cogwheel phenomena. No atrophy or paralyses. (b) There was a definite coarse intention tremor of the extremities, which was entirely absent at rest. (c) Gait was typical of spastic ataxia. (d) Speech was not typically scanning, was slow and deliberate, and enunciation was very poor. This was evident in ordinary conversation, without the use of test phrases.

(8) *Sensory.*—(a) Both superficial and deep sensation was entirely normal. (b) Heel to knee and finger to nose tests were very poorly performed. Romberg test was positive, but there was no tendency to fall in any one direction. (c) Position sense was poor. (d) Vibratory sense was normal. (e) No asteriognosis or adiadococenesia.

(9) *Reflexes.*—(a) Deep reflexes were exaggerated throughout, there were no inequalities. (b) Abnormal reflexes were absent but the cremasteries were preserved. (c) No pyramidal tract signs were present.

Lumbar puncture was done, and the spinal fluid pressure was found to be normal. Dynamics were normal. The spinal fluid contained only two lymphocytes per cubic millimeter. There was no increase in globulin, and the Wassermann test was negative. The colloidal gold test was not done. Other laboratory reports were as follows: urinalysis was normal save for a very faint trace of globulin and an occasional granular cast. Hemoglobin was 81 per cent and erythrocytes 4,760,000 per cubic millimeter, color index 0.86, leucocytes 9,400, polymorphonuclears 80 per cent, lymphocytes 19 per cent, eosinophils 1 per cent. Icterus index 4.5. Gastric analysis showed free hydrochloric acid 22 and a total acidity of 34. Blood Wassermann was negative. Blood chemistry and renal function were normal. Basal metabolic rate was minus 18 per cent. X-ray of the genito-urinary tract showed no evidence of calculus or other abnormality.

Digital examination of the prostate showed it to be normal in size and consistency, and there was no pus found in the material expressed. Two ounces of residual urine remained in the bladder after voiding, with much straining and an effort to empty it completely, but a number 14 soft rubber catheter passed into the bladder without the least difficulty. In view of the fact that the patient showed such definite evidences of scattered involvement of the central nervous system, and no evidence of organic obstruction, it was presumed that his urinary difficulties were due to a neurologic bladder, and cystoscopy was not done.

Before considering the details of the family history, it is well to note that all of these cases have occurred in two counties of Virginia, Accomac and Northampton, which make up what is

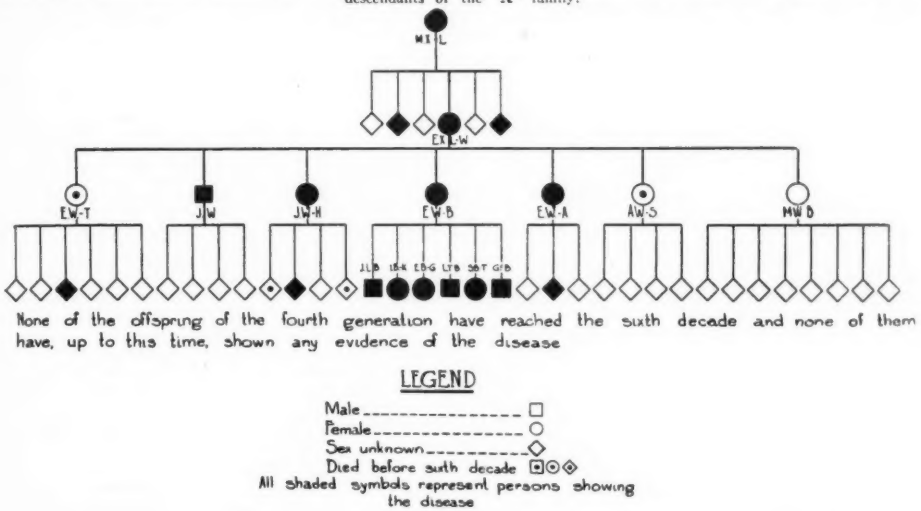
Table 1

Showing incidence of neurological signs usually associated with disseminated sclerosis in patients of this group who were examined but not reported in detail.

Number	Initials	Age	Nystagmus	Abdominal Reflexes	Deep Reflexes	Pyramidal Tract Signs	Intention Tremor	Temporal Pallor	Diplopia	Spastic Ataxia	Sensory Disturbances	Dysarthria	Emotional Disturbances
1	G.F.B.	60	+	—	+++	—	+	+	+	+	—	+	—
2	J.L.B.	74	+	—	+	+	+	+	+	+	++	+	+
3	L.J.B.	66	+		+++	—	+	+	+	+	+++	+	++
4	E.B.G.	68	+	—	+++	—	+	+	+	+	+++	+	+++

Chart 1

Genealogical chart showing incidence of a neurological condition resembling disseminated sclerosis in four generations of the descendants of the "X" family.



known as the Eastern Shore, a narrow peninsular which extends southward from the Maryland line to Cape Charles, thus separating the Chesapeake Bay from the Atlantic Ocean. Because of this isolated environment, and the lack of rail transportation until recent times, the inhabitants of this section had traveled little, and the descendants of the older families are widely scattered throughout the region. It is common knowledge among the older inhabitants of this section that for generations this neurological condition has been present in a certain family, which we have designated as X, and in most of its collateral branches. All the cases which we have presented trace a direct line back to this family. It is interesting to note that the history of the X's, as shown in the accompanying diagram, is not hearsay information, but was obtained from the mother of the four cases herein reported. Mrs. X was, at the time, more than ninety years of age and was suffering from the disease herself to the extent that she had a complete paraplegia, but she had retained her intellectual faculties in their entirety. This old lady personally knew her grandmother, her great aunt and her mother, all of whom had symptoms similar to those reported.

A glance at the accompanying chart will show the incidence of this condition through four generations of the descendants of one member of the X family. The condition first appears in its victims during the sixth decade and progresses slowly to complete spastic paraplegia, but apparently has no effect on longevity.

The possibility that these cases are some form of arteriosclerotic cerebral degeneration, or some other senile brain disorder, will very likely be questioned by many of you. It is true that several of these old people had a moderate degree of hypertension, but another had a systolic blood pressure of 135 millimeters of mercury, with no evidence of generalized arteriosclerosis. Each of them had a relative degree of retinal arteriosclerosis, but in no case was there any advanced sclerosis of the retinal vessels. The urine in none of them showed evidence of pronounced nephritis, and the blood chemistry of one of the patients, who had an increased blood pressure, was well within normal limits. Combined system disease might be diagnosed, except for the fact that the case which we thoroughly worked out did not show the least laboratory evidence of pernicious anemia, and the other cases gave no clinical or laboratory suggestion of that entity. We know of no condition of the central nervous system which the picture we have described fits so nearly as it does that of multiple sclerosis.

If our charts and our genealogy are correct, there can be no mistaking the familial tendency of the condition described, whatever that condition may be.

This paper is presented in the form of a pre-

liminary report because we have not been willing to make a positive diagnosis of disseminated sclerosis in these cases on account of the absence of postmortem findings. These patients were first seen by us several years ago, and we have waited to report them believing that we would have been able by this time to obtain an autopsy and procure data by which to make a more definite diagnosis. We desire to put these cases on record at this time, and we hope to present our pathological findings at a later date.

Professional Building

BIBLIOGRAPHY

1. Cestan, R.; and Guillan, G.: La paraplegie spasmodique familiale et la sclerose en plaques familiale. Revue de Medicin, Paris, 20:813-836, 1900.
2. Mueller, E.: Die Multiple Sklerose Des Gehirns und Ruken Marks, Jena, 1904.
3. Eichhorst, R.: Uber infantile und hereditare multiple sklerose. Virchow's Arch. f. path. Anat., Berl., 146:173-192, 1896.
4. Leuch: Korrespondenzbl f. Schweizer Aerzte, 43:1890.
5. Wechsler, I. S.: A Textbook of Clinical Neurology, 2nd Ed., p. 548.
6. Gower, Sir William: Diseases of the Nervous System, 2:554.
7. Russell, Risien: Albutt's System of Medicine, 7:51.
8. Taylor, E. W.: Multiple Sclerosis: A Contribution to Its Clinical Course and Pathological Anatomy. Jour. Nerv. & Ment. Dis., 33:361-400, 1906.
9. Davenport, Charles B.: Archiv. Neur. & Psych., 8:51, July, 1922.
10. Curschmann, H.: A. R. N. & M. Dis., 2:17, 1921.
11. Neustaedter, M.: Clinical Neurology, p. 440, 1929.
12. Wechsler, I. S.: A Textbook of Clinical Neurology, 2nd Ed., p. 548.
13. Crocq (quoted by Jelliffe): A. R. N. & M., 2:31, 1921.
14. Jelliffe, S. E.: A. R. N. & M., 2:31, 1921.
15. Brissaud, M.: Sclerose en plaques familiale. Archiv. de Neurol., Paris, 2nd series, 14:535, 1902.
16. Abrahamson, I.: Familial Multiple Sclerosis. Jour. Nerv. & Ment. Dis., 33:200-202, 1906.
17. Weisenberg, T. H.: Multiple Sclerosis: Its Occurrence in Families with Report of Two Cases in a Brother and Sister. Arch. Diag., 2:167-174, 1909.
18. Coriat, I. H.: A Peculiar Form of Family Nervous Disease Resembling Multiple Sclerosis Occurring in Children. Boston Med. & Surg. Jour., 160:506-508, 1909.
19. Krabbe, K.: A New Familial Infantile Form of Diffuse Brain Sclerosis. Brain, London, 39:74-114, 1906.
20. Dana, Charles: Textbook of Nervous Diseases, p. 428, 1920.
21. Reynolds, E. S.: Some Cases of Family Disseminated Sclerosis. Brain, London, 27:163-169, 1904.
22. Batten, F. E.: Two Cases of Family Disease the Symptoms of Which Closely Resemble Disseminated Sclerosis. Proc. Roy. Soc. Med., London, 2: Neurol. Sect., 35-37, 1908-1909.

DISCUSSION (*Abstract*)

Dr. Beverley R. Tucker, Richmond, Va.—This paper brings up a very interesting group of familial cases. I do not believe, however, that there is enough evidence to make the diagnosis of multiple sclerosis and I think Dr. Gayle and Dr. Williams are wise not to make this as a definite diagnosis. I understand that they have permission for an autopsy when one of the patients dies. I would suggest completion of the paper after two autopsies. If the degenerative lesions in the two autopsies are approximately the same it would strengthen the conclusions decidedly.

Dr. Lawrence F. Woolley, Towson, Md.—The whole question of multiple sclerosis has been very much confused. In reading reports of cases showing disseminated sclerotic plaques in the central nervous system, especially reports from the continental literature, one is impressed with the fact that there are many cases of specific etiology as well as a group for which no known etiology can be assigned. Disseminated sclerosis is found at autopsy, of course, and is a pathological diagnosis. It would help to clarify our ideas if an attempt were made to define disseminated sclerosis as a pathological entity and multiple sclerosis as a clinical syndrome, and if we cease using the two terms interchangeably as is prevalent in practice at present.

Dr. Gayle (closing).—We have delayed the presentation of this paper for several years because of the absence of necropsy findings. To date, none of the patients reported in this series has died, although they are quite old. We have been promised postmortem examinations, but because of the time which has elapsed and the fear that pathological specimens may not be obtained, we decided to make this preliminary report. The preponderance of opinion seems to be that there is probably a familial aspect of disseminated sclerosis. This belief, however, is doubted by many organic neurologists. It is, of course, possible that these cases which I have shown are not true disseminated sclerosis. The conditions mentioned by the gentlemen who were kind enough to discuss this paper are certainly possible, and there is likelihood of other organic degenerative changes of the central nervous system as a cause. We have tried not to be dogmatic in this paper, and we shall not arrive at any positive conclusions until we have an opportunity of studying the pathological specimens. However, we are convinced in our own mind that these patients may safely be called cases of multiple sclerosis.

SYMPATHECTOMY IN ACUTE ARTERIAL OCCLUSION*

AN EXPERIMENTAL STUDY

By EDWIN P. LEHMAN, M.D.,
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and
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Our knowledge of the role of the sympathetic nervous system in the maintenance of vascular tonus is in the main clear cut. The physiological effect of removal of the sympathetic influence on the normal circulation is well established. We know that ablation of the sympathetic nerves to extremities and organs results in loss of arterial tonus and a resulting hyperemia. Numerous physiological observations confirm this phenomenon. When the main artery to a part is ligated experimentation has shown that this mechanism operates on the collateral channels.

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Mulvihill and Harvey[1] showed this fact in demonstrating the return to a normal surface temperature level of the dog's foot, which had cooled following ligation of the external iliac artery, when the corresponding sympathetic ganglia were removed. Reichert,[2] in studying the response to environmental changes in temperature of sympathectomized limbs with and without arterial ligation, made similar observations. The recent work of Oughterson, Harvey and Richter[3] offers further confirmation.

This phenomenon, therefore, needs no further laboratory demonstration. The present study is an attempt to evaluate in laboratory animals this known mechanism in regard to its effectiveness in improving volume flow so as to prevent gangrene of an extremity in which the main blood supply has been compromised. The distinction between this process in the otherwise normal animal and the known clinical effectiveness of the mechanism in the presence of vascular disease, as shown by fairly well established present day clinical methods, will be discussed later in this presentation, as will certain considerations which have led to the initiation of this study.

EXPERIMENTS

In 1923 Brooks and Martin[4] established a gangrene rate for the hindleg of the rabbit following ligation of the common and external iliac arteries. With simultaneous ligation of the accompanying veins they were able to show a definite diminution in the gangrene rate. With this work as a background, the same general method was chosen as an effective practical way of demonstrating the results of sympathetic ganglionectomy following ligation of the same vessels.

The experiments were performed in two series. The controls consisted of rabbits in which unilateral ligation of the common and external iliac arteries was done. Although there was in our controls a marked difference in the average period following ligation, at the end of which necrosis appeared, from the corresponding period in Brooks and Martin's control animals, the total incidence of necrosis of the extremity was satisfactorily close to their control standard (*Table 3*). The present series of experiments, therefore, has a double set of control observations.

The experimental animals were subjected to the same ligations and at the same time ipsolateral lumbar sympathectomy was performed.

All operations were done under ether anesthesia and with complete aseptic technic. No animals in which accidental hemorrhage occurred, requiring ligation of veins, were further observed. All experimental rabbits herein reported were subjected to postmortem examination and removal of the lumbar sympathetic chain was verified. Practically all rabbits had an immediate weakness of the involved leg, believed to be ischemic in origin. If points of abnormal pressure on the extremity developed necrosis in the presence of such paresis, these animals were discarded.

The work was greatly delayed by a series of fatalities in the animals in the first twenty-four hours after operation. These were avoided only by changing the breed of rabbit.

The results of the experiments are recorded by dividing each group, control and experimental, into two sub-groups, according to the incidence of necrosis. As in Brooks and Martin's work, any death of tissue ranging from total gangrene to chronic ulcer was classified as necrosis. On account of the relatively long average interval at which gangrene first appeared, no animals were reported as showing absence of necrosis unless under observation for an adequate period. It will be noted that the longest interval after operation at the end of which gangrene appeared was 42 days (*Table 2*). The shortest period allowed to elapse after operation before the animal was placed in the group showing no necrosis was 69 days.

As seen by the tables (*Tables 1* and *2*, summarized in *Table 3*), the gangrene rate, without

Table 1

RESULTS OF LIGATION OF COMMON AND EXTERNAL ILIAC ARTERIES

CONTROLS

Rabbit Number	Necrosis	Days Between Operation and Onset of Necrosis	Total Days of Observation
10	None	—	180
12	Present	26	169
14	Present	29	169
15	None	—	140
18	Present	34	35
19	None	—	98
20	Present	34	35
22	Present	26	37
26	Present	3	28
27	Present	16	28
29	Present	24	25
31	Present	3	22
39	Present	15	28

Table 2

RESULTS OF LIGATION OF COMMON AND EXTERNAL ILIAC ARTERIES WITH IPSOLATERAL LUMBAR SYMPATHETIC GANGLIONECTOMY

EXPERIMENTS

Rabbit Number	Necrosis	Days Between Operation and Onset of Necrosis	Total Days of Observation	Verification at Autopsy of Completeness of Operation
49	None	—	165	Verified
64	None	—	104	Verified
66	Present	12	20	Verified
67	None	—	81	Verified
69	Present	28	35	Verified
70	None	—	69	Verified
71	Present	25	32	Verified
72	None	—	102	Verified
73	None	—	85	Verified
75	None	—	85	Verified
76	Present	28	28	Verified
78	Present	12	12	Verified
79	None	—	155	Verified
80	Present	42	55	Verified
84	None	—	83	Verified
85	Present	16	16	Verified

Table 3

SUMMARY

		With Necrosis	Without Necrosis	Percentage of Necrosis
Controls Ligation alone	13	10	3	76.9
Experiments Ligation with sympathectomy	16	7	9	43.7
(Brooks and Martin) Controls Ligation alone	21	15	6	71.5

Average period between operation and onset of necrosis:
Present study 21.6 days
Brooks and Martin 10 days

lumbar sympathetic ganglionectomy is 76.9 per cent as compared to 71.5 per cent, the control results of Brooks and Martin. With lumbar sympathectomy, the gangrene rate diminishes to 43.7 per cent. The average interval following operation at which gangrene appeared is in our series 21.6 days and in Brooks and Martin's series 10 days.

It is clear from these results that vasodilation of the collateral circulation resulting from lumbar sympathetic ganglionectomy is sufficiently effective to exert a measurable effect on the gangrene rate.

DISCUSSION

It is well, in discussing physiological or clinical intervention on the elements of the sympathetic nervous system, to keep clear-cut the differentiation between the normal sympathetic and the malfunctioning sympathetic. Up to the present time clinical surgery has been rightly limited to attacks on conditions in which the sympathetic is believed to be functionally abnormal. The conditions towards which the surgeon directs his attack are either presumed examples of disease of the sympathetic system itself or conditions in which a coincident disturbance of sympathetic function is believed to account for certain subjective and objective changes. In the first group may be mentioned sympathectomy in causalgia and allied conditions and in certain circulatory disorders. In the second group may be placed sympathectomy in certain types of chronic arthritis.

Unfortunately from the physiological point of view the operative destruction of certain portions of a diseased sympathetic system have not the validity of physiological experimentation, although, of course, the better known sympathetic syndromes, such as that of Horner, are frequently reproduced surgically and by disease.

It may be assumed that any inflammatory disease of an artery is associated with irritation of the sympathetic plexus in the vessel wall, and that, therefore, sympathectomy in such conditions as thrombo-angiitis obliterans is an attack on an abnormal sympathetic system. Leriche[5] summarizes one phase of the situation as follows: "An occluded artery is no more an artery, but a plexus of sympathetic nerves in an abnormal condition." For this reason to show vasodilation of the collateral circulation following sympathectomy in clinical examples of inflammatory diseases of arteries proves nothing in regard to the behavior of the collateral circulation when the vessel is not diseased. In inflammatory diseases of the blood vessels, by sympathectomy, one is presumably breaking an abnormally functioning reflex arc. In the normal vascular tree, one is breaking a normal vasomotor reflex.

The necessity for the present type of study in relation to the acutely occluded artery, there-

fore, becomes clear. It is necessary, however, to call attention to the fact that the trauma of ligation probably stimulates vasomotor impulses. This probability is demonstrated by the effect of the handling of vessels at the operating table, as in the operation of periarterial sympathectomy, during which a major artery may contract into a small pulseless cord. In this limited sense, perhaps, these experiments deal with an abnormal sympathetic system.

Many clinical observations have been made of the effect of sympathectomy on the collateral circulation when there is cause for belief that the sympathetic is operating under abnormal conditions. The current popularity of sympathectomy in all types of vascular disease in which vasospastic influence can be demonstrated is, of course, familiar. One of us in an earlier paper[6] presented suggestive evidence of the effect on the collateral circulation of periarterial sympathectomy as obtained through partial arteriectomy.

A surgical attack on the sympathetic system when it is not subjected to inflammatory irritation is an entirely different and an even more serious matter. It is, of course, solely a method of obtaining hyperemia, of improving volume flow. Parenthetically in this relationship the warning of Brooks and Johnson[7] may be called to mind that "the total amount of volume flow of blood delivered to or returned from" an extremity is not the only factor that determines the state of nutrition of the extremity, and that certain wide variations in the distribution of the blood, which they studied, may, under certain circumstances, have greater influence.

Sympathectomy is probably a more effective method of obtaining hyperemia than the common and much simpler methods employing external heat, diathermy and the like. Where such methods are effective, the thought of sympathectomy as a substitute occurs to no one. It is conceivable, however, that situations may arise in which the substitution of the more effective method, in spite of its risk, might be considered. Such situations could arise only when a massive loss of tissue is seriously threatened from gangrene of an extremity.

As is well known, the ligation of the otherwise normal axillary, common femoral, or popliteal artery is followed by a high rate of massive gangrene. Such ligation is usually done for irreparable traumatic damage to the artery below the point of ligature. The object of this study is to determine whether, in the experimental animal, sympathectomy under such conditions can materially affect the gangrene rate. In view of the clear-cut demonstration that these experiments afford to the effect that the incidence of gangrene is materially diminished under circumstances comparable to the surgical necessities that occasionally arise for ligation at these unfavorable sites, the proposal is tentatively made that in the presence of a seriously diminished volume flow, following ligation of the otherwise normal axillary, common femoral or popliteal artery, sympathetic ganglionectomy should at least occur to the surgeon as a possible means of saving an extremity. It is probable that the risk of this operation, relatively slight as it may be, will, in most instances, render its application unwise. On the other hand, if one can be convinced that the phenomena observed in the laboratory animals herewith reported are reasonably certain to be observed as well in the human being, the surgeon should not reject this possible means of saving tissue without weighing its merits in the individual case with due thoroughness.

The role of clinical surgery in the spread of knowledge of the sympathetic system has in recent years been predominant. There are sufficiently great differences in the anatomy and physiology of the sympathetic system in the laboratory animal from the anatomy and physiology in man to prevent laboratory experimentation from explaining all phenomena that occur in man. In the same sense, all phenomena that occur in the laboratory animal cannot be carried over into the clinic. The proviso above, that one must carry over the results of these experiments into the clinic to justify the procedure in the patient with threatened gangrene, involves an assumption which must be made with caution but with some belief in its justification.

CONCLUSIONS

(1) In the rabbit the gangrene rate, following ligation of the common and external iliac arteries, is, on the basis of two separate studies, more than 70.0 per cent.

(2) The gangrene rate following ligation of the same arteries and lumbar sympathetic ganglionectomy on the same side, is, in the present series, less than 45.0 per cent.

(3) Lumbar sympathetic ganglionectomy is, therefore, under these conditions, sufficiently effective in dilating the collateral tree to diminish materially the gangrene rate in the rabbit.

(4) On the basis of these observations, as well as on the basis of established physiological knowledge, it is proposed that in certain special instances in which massive loss of tissue is threatened following ligation of a major artery, the operation of sympathetic ganglionectomy must be considered.

BIBLIOGRAPHY

1. Mulvihill, D. A.; and Harvey, Samuel C.: Studies on Collateral Circulation. I. Thermic Changes After Arterial Ligation and Ganglionectomy. Jour. Clin. Invest., 10:423, 1931.
2. Reichert, F. L.: Thermal Changes in Denervated and Sympathectomized Limbs with and without Arterial Ligation. Proc. Soc. Exp. Biol. & Med., 29:473, 1932.
3. Oughterson, Ashley W.; Harvey, Samuel C.; and Richter, Helen G.: Observations on Sympathetic Vasomotor Pathways. Ann. Surg., 96:744, 1932.
4. Brooks B.; and Martin, K. A.: Simultaneous Ligation of Vein and Artery: An Experimental Study. J.A.M.A., 80: 1678, 1923.
5. Leriche, R.; and Stricker, P.: Observations on Juvenile Obliterating Arteritis. Brit. Jour. Surg., 16:496, 1929.
6. Lehman, Edwin P.: Sympathectomy by Arterial Excision. Arch. Surg., 21:838, 1930.
7. Brooks, B.; and Johnson, G. S.: An Experimental Study of the Distribution of the Peripheral Blood Flow. Jour. Bone & Joint Surg., 14:102, 1932.

DISCUSSION (*Abstract*)

Dr. Barney Brooks, Nashville, Tenn.—It is worth while emphasizing that paralysis of the sympathetic vasoconstrictor fibers was brought about in Dr. Lehman's experiments for the purpose of increasing the cross section area of the collateral circulatory bed and was not intended to dilate the arteries in that portion of the extremity in which the volume flow of blood had been diminished by occlusion of the primary artery. In other words, Dr. Lehman's experiments demonstrated the beneficial results obtained by increasing the caliber of the vessels supplying the collateral circulation, and not the vessels of the anemic tissues. These are vessels which should not be expected to dilate automatically because they are a part of the circulation presumably unaffected by the arterial occlusion.

Those of you who have attempted to keep up with all the literature concerning the effects of sympathectomy on the circulation have encountered such a maze of loose talk that I am quite sure you have found it refreshing to listen to this clear-cut description of well planned experiments and justified conclusions.

It is likely that the conditions which make the clinical application of Dr. Lehman's experiments advisable will be rarely encountered, but if any one of us has even a single opportunity to save an extremity by the use of this knowledge, I feel quite sure Dr. Lehman will feel amply rewarded for his labor.

OBSTETRIC ANALGESIA: ANALYSIS OF THREE HUNDRED CASES OF ORAL ADMINISTRATION OF SODIUM AMYTAL*

By F. O. PLUNKETT, M.D., F.A.C.S.,
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The physician encounters many human ailments which cause pain, but, I dare say, none so excruciating as the pain of childbirth. Whether it be a curse placed on Eve at the beginning of the human race, or due to changes of the physical being caused by so-called civilization, or what not, matters not to the woman who has to experience it. What she desires is relief from suffering, and today more than ever she is looking to the obstetrician for this relief. If it can be given her without jeopardizing her life or that of her expected baby, it should be given.

In the past, many drugs and combinations of drugs have been used to obtain obstetric analgesia. Some of the more prominent and generally used are chloroform, ether, ethylene, morphine, morphia-scopolamine combination, nitrous oxide, ether-quinine-oil combination with magnesium sulphate. During the past three years tribrom methyl alcohol (avertin) and the barbiturates, sodium amytal, pernocton, nembutal and nembutal with paraldehyde have been rather extensively used. Judiciously, intelligently and scientifically administered, obstetric analgesia may be obtained by any of the drugs or combinations just mentioned with very little danger to mother or baby. If they are badly administered, any one of them may cause trouble, even death to mother or baby. Some are more dangerous than others, and we believe that sodium iso-amyl ethyl barbiturate (sodium amytal) properly administered by mouth is the least dangerous to mother or baby.

During the past eighteen months we have used sodium amytal in 300 cases: 98 per cent were hospital deliveries, the other 2 per cent home deliveries. Excepting an occasional case in which sodium amytal was contraindicated, or in precipitate deliveries, these cases were not selected, but were taken consecutively as they occurred in my private practice and clinic pa-

*Read in Section on Obstetrics, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

tients at the Virginia Baptist Hospital, Lynchburg Hospital, and Memorial Hospital.

We studied especially the reports of Hamblen and Hamblen, Robbins, McCallum, Mendenhall and Zerfas, Massey, Collier, Nelson, Dodek, Lundy, Cullen, and Bristol before using sodium amytal. Our experience with the first 50 cases, however, taught us that this drug is not without danger to baby or mother, and among other things caused us to individualize our dosage instead of following a routine.

We have lost only one baby during this series that could be charged to sodium amytal.

In this case the mother, para 1, weight 160 pounds, age 22, was in good physical condition with a normal pelvis. When uterine contractions were occurring at intervals of 7 to 10 minutes, of moderate strength, the os was dilated 2 cm. and the cervix partially effaced, sodium amytal, grains 15, was given and four hours afterwards 6 grains were given. Excellent analgesia and amnesia were obtained. During the second stage there was no cooperation from the patient. Drop ether was given, episiotomy was performed and the baby delivered by prophylactic forceps, using only moderate traction. Upon delivery the air passages were clear, the heart pulsating, but the baby was pale, limp, and despite all methods of resuscitation employed, respiration could not be established. Autopsy was refused and while we cannot say positively that death was due to the analgesia, it probably was.

Among the first 50 cases we had 5 babies that were cyanosed or narcotized. The mothers had received 18 grains or more of sodium amytal, and we attributed the infants' condition to the drug. They were resuscitated. After the first difficulties with our babies we began administering oxygen routinely to the mother from the time that the baby's presenting part was on the perineum and about to be delivered, until cord pulsation ceased. Since the establishment of this procedure we have had no difficulties with our babies that we could attribute to sodium amytal.

In determining the dose of sodium amytal for each patient we are guided by weight, blood pressure, reactions to pain, muscular tone, character of uterine contractions, and we are ever mindful of the fact that the patient might have an idiosyncrasy to the drug. For a patient weighing 120 to 150 pounds, with blood pressure 110 or higher, uterine contractions occurring 7 to 10 minutes, os dilated 1.5 to 2 cm., complaining of moderate pain, we give an initial dose of 9 grains, followed in an hour by 3 to 6 grains if the patient is still complaining of pain or is restless between pains. Usually, if the uterine contractions are not too severe or strong, the first and second dose will keep her quiet and without appreciable pain for three to four hours. If, after that time, the patient becomes very restless or contractions are painful, she may have a third or even a fourth dose of 3 grains, provided her blood pressure is not below 110 and respiration and pulse rate are not too slow. Patients weighing 150 pounds or more, with a blood pressure above 120, may have an initial dose of 12 to 15 grains, and doses thereafter according to the indications just mentioned. Any patient with marked hypotension or asthenia, if she receives amytal at all, should have an initial dose of not over 6 grains, and if further doses are required, not over 3 grains.

Usually, in fifteen minutes after the initial dose, the patient begins to get drowsy. In half an hour she is sleeping between pains, and in forty-five minutes to an hour, unless uterine contractions are very strong or the patient hypersensitive to pain, she is fully under the effect of the initial dose. Then either the attending physician, intern or a thoroughly competent nurse should watch her constantly until she has reacted from the drug. Especially slowing of the pulse and respiratory rate and hypotension should be observed. In the presence of a blood pressure below 90, a pulse rate below 60, or a respiratory rate below 12, give immediately an ampoule of ¾ grain ephedrine or 7½ grains of caffein-sodio-benzoate, or both, and no case should ever receive sodium amytal in either a large or small dose unless the two drugs are immediately available.

In this series we had 3 cases that went into a state of collapse, two during delivery, and one half an hour following delivery, we think, solely from sodium amytal. The first received a total dosage of 24 grains, the second 15 grains, and the third, 6 grains. The first two responded promptly to ephedrine, caffein-sodio-benzoate and carbon dioxide, but to the third we had to give normal saline intravenously and other stimulants in addition to the above, and it was at least two hours before we felt comfortable about her. These patients undoubtedly had an idiosyncrasy to the drug. Certainly the one who received only 6 grains was hypersensitive. Our usual precautions were employed in determining the dose for these 3 patients.

Sodium amytal may be given in the home, but unless the physician has time to remain with the patient throughout labor, the dose should be small, never more than 6 grains as the initial dose, with a total of 9 to 12 grains.

Even this will afford the woman in labor much relief.

In 85 per cent of our cases we obtained excellent analgesia and amnesia; in the remainder good or fair. For actual delivery we give nitrous-oxide, as episiotomies are done routinely on primiparae, and in many cases prophylactic forceps are used. Many cases are very restless during uterine contractions, but remember nothing of it after delivery. In the majority of cases where large doses of barbiturates are given, cooperation from the patient is hard to obtain and the expulsive powers are slowed during the second stage. Sodium amytal was equally effective in primiparae and multiparae, and may be given at any time during labor.

CONCLUSIONS

(1) Sodium amytal is not without danger to mother or child but, scientifically administered, it is the least dangerous of the drugs at our command today for obstetric analgesia.

(2) Ephedrine and caffein - sodio - benzoate should always be immediately available when sodium amytal is given.

(3) Give oxygen to the mother when the baby is about to be delivered and continue its administration until the cord pulsation ceases.

(4) Where massive doses are given do not leave the patient alone for an instant until she reacts from the drug.

(5) Complete analgesia and amnesia is obtainable in the great majority of cases.

(6) The drug can be given at any time during labor, but preferably in the beginning.

(7) Let the patient's weight, blood pressure, muscular tone and the character of the uterine contractions be your guide as to the size of the initial dose. The degree of restlessness and discomfort should guide you as to repetition.

(8) Labor, as a whole, is not prolonged, but is really shortened by the barbiturates. However, in many cases the second stage is prolonged unless episiotomies and prophylactic forceps are employed.

(9) This series of 300 cases has given us much information, matured our judgment in many ways, and today we are giving sodium amytal routinely without fear. We are ever mindful of the possibility of danger to mother and baby.

DISCUSSION (*Abstract*)

Dr. M. Pierce Rucker, Richmond, Va.—I am sorry that Dr. Hamblen is not here to open this discussion, for it is he who deserves the credit of working out the dosage for the oral administration of sodium amytal in obstetrics. My experience consists of 477 cases. My usual plan is to give an initial dose of 12 to 18 grains and then add hyoscine in 1/200 grain doses as necessary. In the second stage of labor most of my patients have received some form of anesthesia. I find that only 24 patients received sodium amytal alone; 380 were given ether; 376 received from 1/200 to 1/40 grain of hyoscine; 39 had rectal ether-oil; 28 had avertin; 27 spinal anesthesia; 12 nitrous oxide-oxygen; 7 chloroform and 2 ethylene.

The patients require more than usual nursing care. Approximately 95 per cent had complete amnesia. The failures fall into two groups: (1) a small number make such slow progress that they have to be allowed to come out partially; (2) certain patients, usually multiparae, make such rapid progress that they get ahead of the analgesia. For these I am now giving an initial dose of 1/100 grain of hyoscine instead of 1/200 grain.

The maternal complications in this series are as follows:

Toxemia (pre-eclamptic)	26
Eclampsia	8
Premature separation of placenta	6
Placenta previa	10
Contraction ring	14
Hydramnion	7
Mental derangement (both antepartum)	2
Prolapsed cord	1
Mastitis	22
Cholecystitis	3
Pyelitis	9
Phlebitis	3
Infection	17
Amputation of cervix (with caustic by a so-called cancer doctor)	1
Postpartum hemorrhage	7
Retention of urine	3
Uterine inertia	1
Shock	2

Of these, only the last four need to be discussed in connection with sodium amytal. The possibility of shock must always be borne in mind. My two cases caused me no great alarm, responding promptly to elevation of the foot of the bed and a hypodermic of strychnine. Nor were the postpartum hemorrhages severe. Several required packing, but usually they required only a hypodermic of 500 c.c. of saline into which was put 1 c.c. of pituitrin. Three cases in the 477 required catheterization in the first few days postpartum, and one had primary uterine inertia. The percentage of frequency of these complications does not seem to be significant.

Among the fetal complications to be noted are 1 case of convulsions, one of hydrocephalus and 8 cases of twins. There were 6 abortions, seven stillbirths and 13 neonatal deaths; a total of 26 or a gross death rate of 5.36 per cent. If the 6 non-viable fetuses be deducted, the stillbirth and fetal death rate is 4.18 per cent. One was a case of prolapsed cord that was pulseless when the patient entered the hospital. A number were premature, with toxemia or placenta previa as a cause for the prematurity. None could be honestly attributed to the anesthetic.

In conclusion, I think Dr. Plunkett is wise in emphasizing that sodium amytal is not a fool proof analgesia and that one must be constantly on the outlook for shock and be prepared to treat it.

Dr. Milton Smith Lewis, Nashville, Tenn.—I have used sodium amytal in over 700 cases, intravenously,

intramuscularly and orally. Our first cases included its use by the intravenous route. We are at present using it by the oral route to compare its effect with the intravenous.

Probably the best technic of dosage is to feel the patient out by giving her small doses and repeating it as often as necessary until we get the desired effect. Our average dosage has been 15 to 18 grains. In only a very few cases have we given more than 20 grains by mouth. Our usual technic is to give morphine grains 1/6 and scopolamine grains 1/150 during the first stage of labor and after a reasonable time we give 6 grains of sodium amytal and repeat the amount until the patient is well under the influence of the drug. We have found out that it is almost impossible to set a certain dosage for all cases. The amount to be used is a matter of individual tolerance or idiosyncrasy. In a number of cases, 7.5 grains intravenously did not completely narcotize the patient.

We have given sodium amytal to a number of multiparae intravenously one-half hour before birth without any effect whatsoever on the child.

We have as yet to see deleterious effect upon the infant from either intravenous or oral sodium amytal. An occasional case seems to be a little more narcotized than others, but there has never been great difficulty in resuscitating any of our infants.

Dr. E. L. King, New Orleans, La.—When sodium amytal was first introduced it was given an extensive trial in one of the obstetrical clinics at the Charity Hospital of New Orleans. It was administered intravenously to normal obstetrical patients, but it was found that its use was followed by marked restlessness. Analgesia was obtained and the patients were very much gratified with the results, but it was difficult to secure their cooperation especially at the end of the second stage. We have more recently employed it by mouth in somewhat the manner described by Dr. Plunkett, with extremely good results.

We give from 6 to 9 grains when labor is well established and the patient begins to complain of pains. We find that it is best to combine it with 1/8 to 1/6 grain of morphine sulphate, depending upon the stage of labor and the intensity of the discomfort. This combination gives better results than amytal alone. In this way we can usually carry the patient through the first stage very successfully in most instances.

We depend upon ethylene anesthesia for the greater part of the second stage and for the actual delivery. We find it necessary to begin earlier in multiparae than in primiparae, and frequently we commence its administration by the time the cervix is two thirds dilated. By the use of this combination we can in most instances secure very satisfactory analgesia.

Dr. Plunkett (closing).—The majority of our cases receive sodium amytal early in labor, but occasionally a multipara received it only a short time before delivery. In these cases it had no ill effects upon the baby.

We have used scopolamine occasionally, early in labor, in conjunction with sodium amytal to enhance the analgesia, and with good results, but occasionally it causes delirium or increases it. Scopolamine should never be used near the end of labor.

In home deliveries, this drug may be used with much benefit to the patient, but as previously stated, we never give more than 6 grains as the initial dose, and more than 3 as a repeat, unless the physician or a well trained nurse can remain constantly with the patient.

FRACTURES AND DISLOCATIONS OF THE ELBOW*

By R. T. Hudson, M.D.,
Louisville, Ky.

Fractures about the elbow are of such common occurrence and so often lead to permanent impairment of function that they should always be considered serious injuries and deserve careful analysis.

At the time the patient is first seen a careful history of the accident should be obtained and a thorough examination made for nerve and blood vessel injury. Anteroposterior and lateral roentgenograms, with comparative views of the well side, should always be made before any manipulation is attempted and after reduction is complete.

Elbow injuries are much more common in childhood and, on the whole, less accurate reposition of the fragments leads to better ultimate function because nature is very kind in reforming the joint to suit the functional needs. However, let me say here that the ultimate functional result and the time of convalescence is directly proportional to the nicety of reduction.

To treat elbow injuries intelligently a complete knowledge of the anatomy is essential. The elbow is a ginglymus or hinge joint, really composed of three portions: the joint between the humerus and ulna, the humerus and radius and the radius and ulna. The entire joint is enveloped in a synovial membrane, the capsule. Four movements are possible: flexion, extension, supination and pronation. Unless a proper relation of the bones exists there is certain to be a disturbance of function.

Elbow Dislocations.—Dislocations are much more common in childhood. Five types are possible, namely:

(1) Anterior
(2) Posterior
(3) Internal
(4) External
(5) Dislocation of the head of the radius

*Read in Section on Bone and Joint Surgery, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

The posterior is by far the most common, resulting from a fall on the outstretched hand, displacing the coronoid and head of the radius into the olecranon fossa. In the acute type, reduction is usually easy under general anesthesia. Campbell[1] states that if the dislocation has existed three weeks or longer, there is so much scar tissue and contracture of the soft parts that it is always advisable to do an open operation to restore the normal relationship.

Another fairly common type of dislocation, seen usually in adults, is a dislocation of the head of the radius, with or without fracture. Reduction is easy with simple dislocation, and function is usually complete if the joint is immobilized sufficiently long for repair of the orbicular ligament to take place. When fracture of the head or neck of the radius complicates the injury the problem is much more difficult and open operation, with removal of a loose fragment, is often necessary for functional restoration. The type of fracture and the amount of dislocation should govern the treatment.

Fractures of the Elbow.—I wish to call your attention first to fractures of the lower end of the humerus. By far the most common and most serious type, particularly in childhood, is the supracondylar fracture. It usually results from a fall on the outstretched hand or a direct blow. There is often much hemorrhage about the joint, especially if the case is not seen immediately, which complicates the care. When there is excessive swelling and edema it is our practice to put the arm in overhead traction for several days, until this subsides, before attempting any manipulation.

Reduction is usually easily accomplished then under general anesthesia, by hyperextension, to unlock the fragments, and powerful traction, followed by hyperflexion. Anterior and posterior splints are then applied and the radial pulse constantly watched. The patient should be questioned when he has regained consciousness as to pain or numbness, as persistence of these symptoms indicates nerve or blood vessel injury and the angle of flexion should be immediately decreased. Physiotherapy, such as heat, massage, active and passive motion, hasten the return of function, but any manipulation should always stop short of pain. Too vigorous active motion which causes pain actually retards convalescence. "T" fractures and "Y" fractures of the lower end of the humerus are usually adult injuries and require much experience and judgment to treat. Frequently open operation must be resorted to and some form of internal fixation used. The fixation screw described by Dr. W. B. Carrell,[2] of Dallas, Texas, is especially applicable to these cases when such appliances are necessary to maintain reduction.

Fracture of a condyle, usually the external, is not an uncommon injury, particularly in childhood, and many result in loss of the "carrying angle" and considerable functional disability. The axis of the joint is disturbed and open operation with internal fixation is frequently required to restore the normal relationship. Fracture of an epicondyle is a much less serious injury and rarely leads to much disability. It is often difficult to distinguish from a separation of an epiphysis. Many times in elbow injuries in children there is a cartilaginous injury which does not show in the roentgenogram and is a cause of unexpected disability. The prognosis of elbow injuries should always be guarded because there may be an unrecognizable epiphyseal injury with subsequent deformity developing and also because different individuals react differently to the same injury.

Fractures of the olecranon are usually adult injuries, involving the joint. I believe the rule should be open reduction with replacement of the fragments and fixation with sutures. Holes may be drilled transversely through the fragments and position maintained with heavy chromatized sutures. Plaster splints are applied in right angle flexion and immobilization maintained for at least six weeks.

COMPLICATIONS

There are four complications of elbow injuries which I should like to emphasize particularly.

(1) *Volkmann's Ischemic Contracture.*—This unhappy result sometimes follows a supracondylar fracture of the humerus, but is by no means due to faulty treatment. Meyerding[3] reported a series of 128 cases of Volkmann's ischemic contracture in 1930 and states that the condition is not necessarily due to neglect, tight bandages, nor casts, as some of his series occurred when no fixation or treatment of any kind had been given. He states that ischemic contracture results from intrinsic or extrinsic pressure, usually accompanied by an injury, and usually a fracture, in which both the arterial and venous circulation are impaired and the

latter practically shut off. All patients with the deformity stated that during treatment they experienced pain, swelling, numbness and change in color. Eikenbarry[4] reported a series of 21 cases of ischemic contracture in which there had been a persistent posterior displacement of the lower fragment of the humerus and every case had a great deal of pain following application of the splints and being placed in acute flexion.

(2) *Ulnar Nerve Injury.*—These injuries may occur at the time of the fracture or may be delayed or secondary, and develop years later from friction of the nerve and the displaced bone or excess callus.

Harry Platt,[5] in an article in "Robert Jones Birthday Volume," reports in detail 14 cases of ulnar nerve injury following elbow fracture. He concludes that peripheral nerve injuries are rare following correct treatment and when they do develop they usually follow fractures of the lower end of the humerus.

(3) *Malunion.*—This is a great deal more serious in adults than children because of the remarkable compensatory changes in the growth of the bones. Orthopedists are often consulted for the correction of these deformities and it requires a very careful analysis of the disturbed relation of the bones to cope with the situation. Open operation, with removal of the excess or displaced bone, is often necessary.

(4) *Myositis Ossificans.* — Campbell[6] describes this as a low grade inflammatory process and mentions three types, namely: progressive, circumscribed, and traumatic. The traumatic type sometimes develops in the brachialis anticus muscle, following fracture or dislocation of the elbow. The treatment is surgical, with removal of the excess bone when the process of ossification is complete.

SUMMARY

(1) Elbow injuries should always be regarded as serious injuries and ultimate function depends upon accuracy of reduction.

(2) Practically all these injuries should be treated in the Jones position of acute flexion, except fracture of the olecranon, which usually requires open reduction.

(3) Particular attention should be given to the circulation, pain and numbness following reduction.

(4) A guarded prognosis should always be given, as there are often cartilaginous injuries in children, particularly, which cannot be demonstrated by the x-ray.

REFERENCES

1. Campbell, W. C.: J.A.M.A., 92:122-127, Jan. 12, 1929.
2. Carrell, W. B.: J.A.M.A., 96:670-671, Feb. 28, 1931.
3. Meyerding, H. W.: J.A.M.A., 94:394-400, Feb. 8, 1930.
4. Eikenbarry, C. F.: Jour. Bone & Joint Surg., 10:757-762, Oct., 1928.
5. Platt, Harry: On the Peripheral Nerve Complications of Fractures and Dislocations of the Elbow. Robert Jones Birthday Volume, p. 195, Oxford University Press, 1928.
6. Campbell, W. C.: J.A.M.A., 92:122-127, Jan. 12, 1929.

DISCUSSION (*Abstract*)

Dr. Philip D. Wilson, Boston, Mass.—There are certain injuries of the elbow the importance of which I should like to emphasize: first, rotary dislocation of the capitellar epiphysis. This injury occurs in children, and unless its true nature is recognized and the lesion properly treated, it results in a bad deformity. The epiphysis of the capitellum, usually with a plaque of bone detached from the external condyle, is torn off and rotated outward and usually turned upside down. In this position there is loss of contact between the raw bony surfaces, and failure of healing will result unless it is properly reduced.

The only way to reduce this fracture is by open operation, when it can be sutured back into place quite easily. I have followed a number of unreduced cases in later life, in which the capitellum was represented by a loose, ununited fragment. They developed an increasing valgus deformity of the elbow, and ultimately a delayed ulnar nerve palsy. This condition can be prevented by open reduction in the early stage and replacement of the fragment.

The second injury that I wish to mention is fracture of the medial epicondyle associated with postero-lateral dislocation of the elbow. In a certain number of these cases the epicondyle carrying with it the ulnar nerve is displaced over the humeral condyle so that it lies on the trochlear surface. When the dislocation is reduced, the fragment is caught and retained in its intra-articular position with pressure on the ulnar nerve and resulting ulnar palsy. The possibility of this occurrence must always be borne in mind in reducing any dislocation of the elbow associated with fracture of the internal epicondyle. Immediate post-reduction films should be made to check up on the position, and if the fragment is shown to be lying in the joint space, an immediate open operation should be done and the fragment removed. There has been some question whether it is a better policy after freeing the nerve to suture the fragment back in position, or whether it should be excised. The bone fragment is small so that it has no functional significance, and for this reason I favor excision. At the same time I believe the ulnar nerve should be transplanted to the front of the condyle in order to remove it entirely from harm's way.

Dr. Hudson (closing).—Probably I did not make myself clear as to our treatment of the supracondylar type of fractures. It is only the cases where there is much hemorrhage and swelling, and danger of circulation is imminent, that we treat temporarily with overhead traction. Just as soon as it is felt that reduction, followed by splinting, can safely be done, we proceed in the usual manner and put them in the Jones position.

FRACTURES AND SPLINTS ABOVE THE BELT*

By R. A. Woolsey, M.D.,
St. Louis, Mo.

The prime object of splints is to promote rest and relieve pain through the proper angle of fixation and proper degree of immobilization of joints, contiguous to the infirmity. Contusions and inflammations are just as surely entitled to proper fixation as are fractures or dislocations. Proper fixation means maximum comfort with minimum pressure. Fractures properly reduced, with the limb fixed at the proper angle to overcome or equalize muscle pull, do not require splint pressure. Pads intended to produce pressure enough to overcome deformity, or splints used with the same thought, should be condemned since they never accomplish their purpose.

One should never lose sight of the fact that undue pressure is responsible for Volkman's contracture, gangrene, neuritis, and so on. For this reason, casts of no matter what character should never be applied until after edema begins to subside, unless they are slit on opposite sides as soon as they are dry to allow for swelling.

Few fractures permit proper reduction without an anesthetic, following which the deformity should be increased and enough extension applied to bring the fragmented edges in apposition, allowing them to engage. This acts as a fulcrum. The distal fragment being the lever, should be pulled down to its normal position or slightly overcorrected to allow the fragments to dovetail. After this method, a tight dressing is not necessary.

Fractures that have tissue interposed or cannot be properly reduced or maintained should be subjected to open operation in from seven to ten days from the date of injury. Lane plates should be applied to shafts if the muscle pull warrants it. Otherwise bone grafts or intermedullary pegs are used if necessary. Use screws, pegs, wire or kangaroo tendons to control fragments.

Lane plates were never intended to be used without the adequate support of an external splint, which should be even more carefully applied than in cases where open operation is unnecessary. It is our contention that improper supplementary splinting is responsible for loosening the screws and setting up irritation that produces rarefying osteitis, rendering the plate a foreign body, which has resulted in its condemnation. All plates should be removed within two or three weeks if they are the least source of irritation.

Fractures into joints require special attention. Positive fixation should be accomplished and maintained until after the fracture has healed, since early motion promotes undue callus formation and consequent limited excursion. Joint exudate should be limited as much as possible by ice bags and elevation. Mild extension may be necessary to prevent joint trauma and subsequent adhesions. Autogenous grafts and intermedullary pegs should be used to bridge defects and in non-union with excessive sclerosis of bony ends.

Simple fracture of the inferior maxilla is usually held in position by the Barton bandage. More complicated fractures should be splinted to the upper jaw. The dental clamps made to slip over individual teeth make this comparatively easy. One point I should like to make in this connection is that wire should be discarded for silk or linen, which has all and more of its advantages and none of its disadvantages.

Spine injuries or disease should be treated by cast or Bradford frame, extension and counter-extension. Laminectomy should be performed for pressure symptoms. Autogenous grafts should be applied when necessary to obtain immobilization.

Fractured ribs are best splinted with adhesive plaster. Reduction is not important unless pleura and lung are perforated.

Fracture of the scapula should be replaced and the entire shoulder girdle and arm immobilized. If the glenoid fossa is involved pressure should be relieved by an axillary pad and the lower arm should be strapped to the side. Motion is begun late on account of excessive callus.

Fracture of the clavicle should be reduced and maintained by a dressing that will hold the shoulder upward, outward and backward. The best dressings are Moore's, Sayer's and Valpeau's in the order named. Where proper approximation cannot be obtained or maintained, a light vanadium steel plate, bent to conform

*Read in Section on Railway Surgery, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

to the clavicle, should be applied to be removed later, since it is just under the skin.

Fractures of the surgical neck of the humerus when impacted and in fair position should be dressed in a comfortable splint such as Valpeau's and not disturbed for three weeks. When not impacted, rotation of the head is common, dislocation is rare. Under complete anesthesia, proper manipulation with the arm abducted and rotated to meet the head usually obtains approximation which should be maintained by a bracket splint holding the arm at the angle at which the reduction was obtained. Extension should be maintained to protect the fragmented head and the glenoid fossa. Open operation is sometimes necessary to make reduction, at which time the head should be sutured in place with kangaroo tendon or removed, depending upon its nutrition.

Fracture of the greater tuberosity is attended with considerable disability. It is usually caused by direct violence. The same violence usually traumatizes the joint surface, calling for the same treatment as fracture of the anatomical neck. Open operation is sometimes necessary to replace a tuberosity by using a screw.

Fracture of the surgical neck occurs below the tuberosities to which the muscles are attached, which action rotates and abducts the upper fragment. The muscular action on the shaft is upward and inward. This fracture requires much the same manipulation for reduction as fracture of the anatomical neck, and it should be followed by much the same treatment. If good position cannot be procured and maintained the Lane splint should be used without hesitation. Removal is not necessary.

Fracture of the shaft of the humerus is more often attended by non-union than any other bone, because of the difficulty of applying a proper dressing. Proper position is usually easily obtained and should be maintained by careful study of the position of the fracture. The body can be padded to a straight line and the arm splinted to the trunk or a plaster splint molded to conform to the shoulder, arm and forearm, or a crinolin dressing including the shoulder to the opposite axilla and the forearm to the wrist. This should be split as soon as dry. The wrist and hand should never be included. The forearm should be carried in a sling else its weight will separate the fragments. Extension is sometimes used to advantage, but should not include the forearm on account of the damage to the elbow joint. Lane's plate should be used when all else fails.

With the exception of the olecranon, fractures near the elbow should be treated by the Jones method of complete flexion. This, of course, should stop short of blood vessel compression.

Fracture of the forearm above the middle should be reduced and fixed with a posterior angular splint in extreme supination. Fracture below the middle of the forearm should be fixed midway between pronation and supination with a long posterior angular splint and a short anterior splint cut away to avoid pressure on the thenor emminence. These splints should be wider than the forearm to protect it from lateral pressure and resulting ankylosis of the ulna and radius, hindering pronation and supination.

After all, each fracture should be treated on its own merits. The simpler the appliance to suit the individual case the more certainty of success. Mechanical ingenuity is more valuable than all the splints on the market.

DISCUSSION (*Abstract*)

Dr. H. Earle Conwell, Birmingham, Ala.—Dr. Woolsey has attempted to discuss a very extensive subject in a very short paper, and for this reason my criticism cannot be too specific.

I believe at least 60 to 65 per cent of all fractures can be and are treated by the use of plaster casts and plaster splints. Certain other types of cases will demand traction, and in others, but in a very small percentage, open reduction will be necessary.

Stock splints have a limited use and are only adaptable in a small percentage of cases. The stock splints or ready-made splints should not be depended on too much. Generally speaking, the Thomas splint is practically the only universal and adaptable stock splint which we have. No so-called stock splint will fit every fracture, and the surgeon using the splint should remember that the splint is to be made to fit the patient and not the patient made to fit the splint.

Fractures of the same type cannot be treated in a routine way in every instance. Each fracture is a law unto itself and the treatment depends upon the surgeon treating the case.

One's ability to treat fractures is not determined by the number or the type of splint he uses, or by the number of open or closed reductions, or the type of internal fixation which he uses, but by the functional results obtained, and to obtain functional results means generally good alignment, union and restoration of muscle and nerve function.

To repeat, the treatment of an individual fracture depends upon the ingenuity, experience, mechanical knowledge and common sense of the surgeon. It is the man behind the splint and treatment and not so much the splint and treatment that is doing the work.

A NEW TYPE OF SACRO-ILIAC BRACE*

By F. WALTER CARRUTHERS, M.D., F.A.C.S.,
Little Rock, Ark.

The urgent need of a simple, yet effective sacro-iliac belt or brace has long been recognized by the leading orthopedic surgeons.

The sacro-iliac belt which I am presenting to you today has proven successful not only during the convalescence following sacro-iliac conditions, but it fills a long wanted and much looked for support in the treatment of our so-called lumbagos or sacro-iliac strains and sacro-iliac dislocations.

In my endeavors to obtain a simple and yet effective brace for these conditions, I have been working in conjunction with my brace department at Little Rock under the direction of J. L. Harris and Roe McCranie, who have been most helpful with their suggestions and efforts.

Five or six years ago Mr. Harris became a victim of a slipping sacro-iliac on his right side, and after prolonged trials with the different kinds of sacro-iliac belts, we conceived the idea of the one which we are now presenting to you.

This brace is in no way offered as a substitute for any of the other types or devices and must not be confused with a lumbosacral belt. It is simply a sacro-iliac brace.

ADVANTAGES AND USES

This sacro-iliac brace has many advantages and uses and for several years the writer has found it very effective and most useful in the treatment of sacro-iliac strains, low back strains, painful sacro-iliac arthritis, slipping sacro-iliac and congenital abnormalities in the sacro-iliac region.

I have yet to find a patient, especially those who have worn supports or braces of other types, who has not said that this is the best and most comfortable support he has ever tried, and gives him more relief than anything he has used before. They are very grateful for the support and relief that it has given.

CONSTRUCTION

The brace is made from first quality sheet steel, 20 gauge, which is obtainable from the Crucible Steel Company of America. The attachments are made with copper rivets and padded with leather and three-eighths inch thick white wool felt.

The brace is made to conform to the individual case, therefore measurements are necessary, which are made from the superior spine around the spine to the other superior spine on the opposite side. The sacro-iliac pad is usually 9 x 3 inches. (*Fig. 1.*)

Fig. 1
Posterior view shows the brace is made of three pieces of flexible steel, to which the sacro-iliac pad is joined to the metal piece.

To the sacro-iliac pad there is attached in the center a curved center strip of steel to which is attached the pieces that brace the ilium on each side. The curve around the ilium could not be obtained without the separate attachments to the sacro-iliac pad. The joining of these pieces of steel makes a continuous belt to include the ilium and to these is attached the web belting by which the brace is held in position on the patient (*Fig. 2*).

Fig. 2
Lateral view shows the sacro-iliac pad attached to the web belting with the buckle, which means the belt is completed.

215 Exchange Bank Building

DISCUSSION (*Abstract*)

Dr. R. W. Billington, Nashville, Tenn.—This appliance of Dr. Carruthers is an attractive looking one and apparently should give considerable support to the sacro-iliac joints. It would be indicated, of course, only in the cases of backache due to a true sprain, strain or subluxation of these joints and not in those due to dis-

*Read in Section on Bone and Joint Surgery, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

turbances in the lumbar or lumbosacral joints or to other causes. I am not saying that sacro-iliac strains and subluxations do not occur, but I am strongly of the opinion that they are far more rare than the diagnoses indicate. I was one of the first men in the South to write a paper on this subject (in 1912) and I now believe very little of what I stated in that first paper as to the frequency of sacro-iliac strain. X-rays have not shown us these alleged subluxations, and most of the so-called physical signs of sacro-iliac joint pain are presumptive and not at all conclusive. I believe that backache is much more frequently due to injury and arthritis in the lumbar region, sometimes associated with arthritis of the sacro-iliacs. Therefore, it is my opinion that with few exceptions our appliances for low back pain should extend high enough effectively to support the lumbar spine.

Dr. Earl D. McBride, Oklahoma City, Okla.—It has been my experience that a brace will keep a sacro-iliac joint from slipping about as well as a brace will prevent a semilunar cartilage in the knee from slipping. Dr. Carruthers' brace is a great improvement and should render very satisfactory support.

I wish to call your attention to a test which I have been using to differentiate between sacro-iliac and lumbosacral strain. I have not come to definite conclusions as to its reliability, but it seems to be very useful in determining the final diagnosis after the other tests have been made for sacro-iliac involvement. It consists of asking the patient while standing to bring his toe to his mouth. If the sacro-iliac is involved complaint will be made when the opposite leg is raised. If the iliolumbar region is involved, the pain will be on the same side as the leg raised. By standing on the leg of the affected side, the weight of the trunk and the opposite side is suspended to the ilium of the affected side by the sacro-iliac joint. When the opposite leg, therefore, is brought to the mouth, it creates a strain and pressure directly on the sacro-iliac joint of the weight-bearing side.

I hope to make a further report in the future on this test.

ASEPTIC ANASTOMOSIS OF THE COLON*

By G. T. Tyler, Jr., M.D.,
Greenville, S. C.

The Scriptural saying, "Of the making of many books there is no end," can be safely paraphrased: of the making of many instruments there is no end. Dr. A has an instrument for this, Dr. B for that operation; and so on down the alphabet, until, like Babel, there is confusion of names, and appliances as well. Whipple is authority for the statement that over 200 methods of aseptic anastomosis of the colon have been devised. Only a few of these will be mentioned: Professor Halsted's, that of Scarff, of Parker and Kerr, of Pringle, of Shoemaker. The general principle of all is the same: to divide the gut, and to reestablish the lumen without soiling the peritoneum.

In the Halsted method the bowel is tied off and divided; raw surfaces are cauterized; the closed segments are brought together and sutured with interrupted mattress sutures. A housed knife is introduced through the rectum. Guided by the operator, it divides the sutures closing the segments, restores the lumen and is withdrawn. This has not proven a popular nor an easy procedure. Scarff, using ordinary clamps, divides the gut with the cautery, sutures the segments over the apposed clamps, reestablishing the lumen by thumb and forefinger after removing the clamps. Parker and Kerr divide the gut by cautery and invaginate the edge over the clamp by a suture, which is later removed. The blind ends of the segments are sewed together over these sutures, which are then withdrawn, restoring the lumen of the bowel.

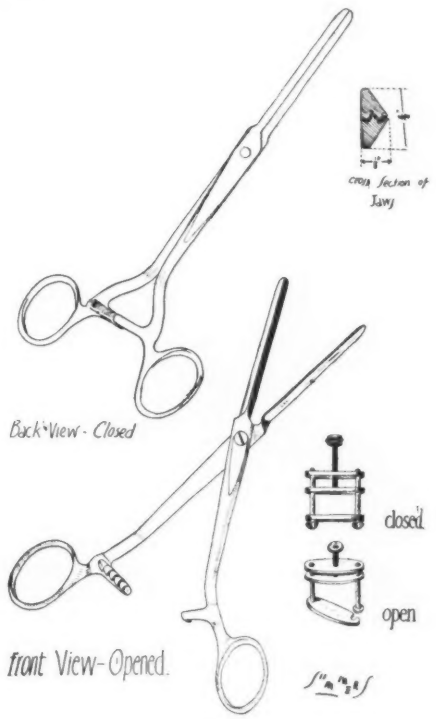

Fig. 1
Clamps opened and closed.

*Read in Section on Surgery, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

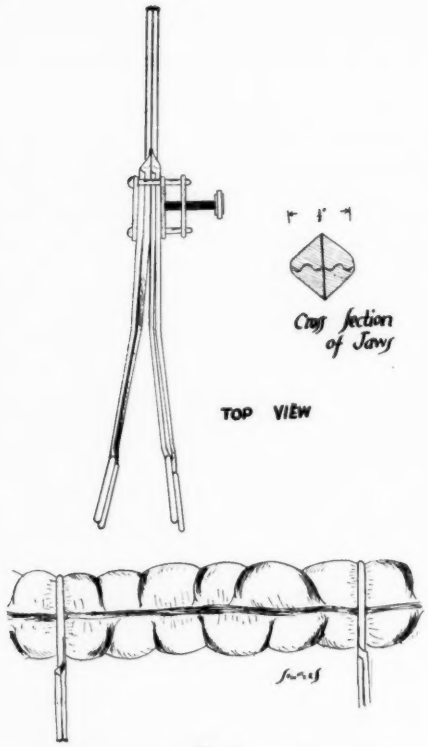

Fig. 2

Above. Clamps in apposition, held by Hoffman cut-off. The handles should be in apposition almost their entire length. The artist has placed the angle too far from the finger holds.

Below. Clamps applied to colon.

It has seemed to me that the success of any method of aseptic anastomosis depends on the small size of the invaginated portion of the bowel wall. If it is too large, obstruction will result. This, I believe, is a real objection to the Parker-Kerr technic. J. S. Horsley reported two deaths from obstruction by this operation, and Stone found it necessary to relieve an obstruction following the same method.

With the idea of having a narrow diaphragm to invaginate, I devised clamps having a jaw 1/8 inch in each diameter. They are applied, the tip being at the mesenteric border. The bowel is divided by cautery. The segments to be united are brought together. The flat surfaces of the clamps lie in contact and are held so by a Hoffman cut-off. The bowel is sutured over the clamps, first on one side, then on the other. The cut-off is released; the clamps are removed; the suture is completed and reinforced where necessary. Thumb and finger separate the walls of the gut and the lumen is reestablished. The invaginated diaphragm is 3/8 inch wide. The portion in the bite of the clamp will slough in a few days. The ¼ inch remaining can hardly cause obstruction. End-to-end as well as end-to-side anastomosis can be done. It can also be used as a substitute for the Rankin instrument where a loop is brought out of the abdomen to be excised later and the lumen restored.

The clamps must be so applied that when brought together the flat surfaces lie in apposition. The bevel on the outside of the jaws was suggested by Dr. J. M. T. Finney. It makes suturing easier. The angle at the handles permits ready unlocking and removal. Longitudinal serrations on the jaws give a firmer hold and allow easier removal. Binding the clamps together converts them into one instrument, eliminates one or two hands from the field of operation, and makes the operation much simpler. As will be seen later, this feature is the only one I have been able to add to what has been previously contributed.*

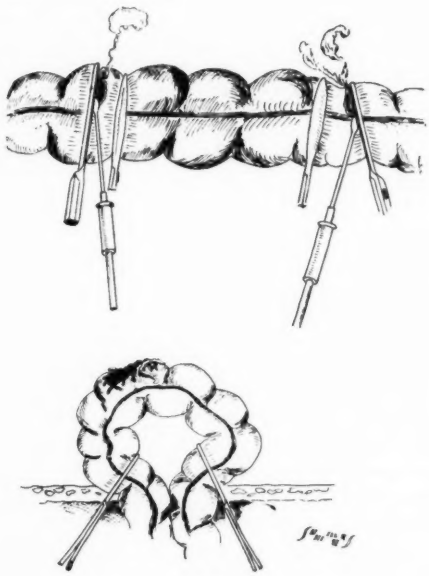

Fig. 3

Above. Cautery division of bowel close to clamps.

Below. Clamps applied to sigmoid for later excision and anastomosis. This method presupposes a proximal colostomy.

*In the *New England Journal of Medicine* (Volume 206, page 943, May 5, 1932), under the title "A New Instrument for Intestinal Anastomosis," Dr. E. L. Young, Jr., describes clamps with an attachment binding them together as one instrument. In this he has anticipated me. He writes me that his instrument has been used successfully in at least fifty cases. My attention was called to this instrument by Dr. J. M. Mason, of Birmingham, Ala.

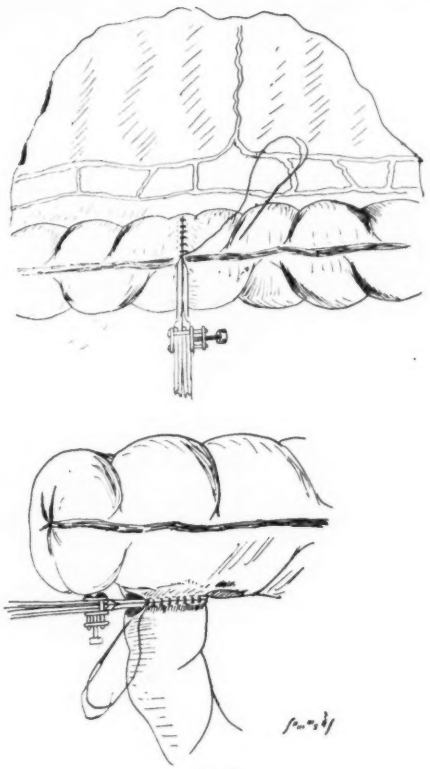

Fig. 4
Above. End-to-end suture over clamps.
Below. End-to-side suture over clamps.

The rapidly growing popularity of preliminary drainage proximal to the lesion renders suture of the colon much safer. Distention is relieved, toxic material is removed, the circulation is restored, and the patient can be built up for a secondary operation. The open method of suture can be used in such cases without risk. But there will always be need for an aseptic technic.

Shoemaker has described an aseptic method, suturing over clamps. He reflects serous and muscular layers, clamps the mucous layer, and divides it. He apposes the clamps and sutures the bowel in layers over them. I did not know of his when my method was devised. Priority is his. There are differences, however, in our methods. He uses a knife instead of the cautery; reflects the layers of the bowel wall, a difficult step, and invaginates only the mucous layer: he does not bind the clamps together.

Pringle uses narrow jawed clamps 3/32 inch wide. He crushes the bowel with a wide clamp, applies the narrow clamp, divides the gut, all layers; and sutures over the clamps. He believes the technic of Shoemaker endangers the aseptic field because the thin walls of the bowel may be injured. This objection is well taken. Besides, nothing is gained; for healing with the entire wall invaginated is just as firm as in Shoemaker's complicated method. In a later paper, Shoemaker reflects only the serous layer, suturing over narrow-jawed clamps. Even this is a difficult and dangerous procedure. Pringle's is almost the same method I have described. With these narrow clamps the gut must be thoroughly sealed by the cautery to prevent leakage.

(Illustrations of the technic were shown.* The special clamps were passed around; also specimens of colon and small intestine sutured by this technic. They were turned inside out. They show the narrow diaphragm. End-to-end, end-to-side, and lateral anastomoses were shown. It was pointed out that in placing the sutures the operator must do it snugly against the clamp or too wide a diaphragm will result. The failure of the Parker-Kerr method is explained. The ends of the segments must be invaginated over a narrow-jawed clamp if a narrow cuff is to be obtained. An ordinary clamp of the Kelly type, over which the invaginating sutures are placed, gives a wide cuff, too wide to guarantee against obstruction.)

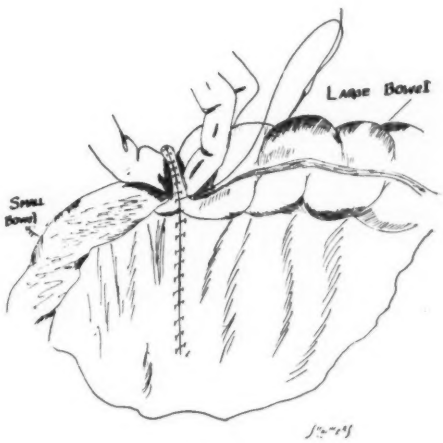

Fig. 5
Restoration of lumen by finger and thumb.

*Some of these illustrations have been adapted from other texts.

BIBLIOGRAPHY

1. Bidgood, Charles Y.: Blind End-to-End Anastomosis of the Sigmoid. Johns Hop. Hosp. Bull., 34:197, June, 1923.
2. Burket, W. C.; and McClure, W. B.: An Aseptic Method of Intestinal Anastomosis. Surg., Gyn. & Obst., 35:816, Dec., 1922.
3. Collins, F. K.: Aseptic Resection of the Intestine. Ann. Surg., 76:739, Dec., 1922.
4. Flint, Jos. M.: The Healing of Gastrointestinal Anastomoses. Ann. Surg., 65:202, Feb., 1917.
5. Fraser and Dott: Aseptic Intestinal Anastomosis, Etc. Brit. Jour. Surg., 11:439, Jan., 1924.
6. Gatch, W. D.: Aseptic Intestinal Anastomosis. J.A.M.A., 59:185, 1912.
7. Grey, E. G.: Studies on the Aseptic End-to-End Anastomosis of the Intestine. Johns Hop. Hosp. Bull., 29:267, Dec., 1918.
8. Halsted, Wm. S.: Blind End Circular Suture of the Intestine. Ann. Surg., 75:356, March, 1922.
9. Highsmith, E. D.: Aseptic Resection of Intestine. Surg., Gyn. & Obst., 36:271, Feb., 1923.
10. Horine, C. F.: Aseptic Technic for Resection of the Intestine. Ann. Surg., 76:745, Dec., 1922.
11. Kerr, H. H.: Intestinal Surgery. J.A.M.A., 81:641, Aug. 25, 1923.
12. Lockhart-Mummery, P.: End-to-End Anastomosis of the Colon. Surg., Gyn. & Obst., 24:247, Feb., 1917.
13. Pringle, S.: Aseptic Resection of the Intestine. Brit. Jour. Surg., 12:238, Oct., 1924.
14. Reichert, F. L.; and Holman, E.: The Fate of Sutures as Observed in Intestinal Anastomosis and in the Healing of Wounds. Bull. Johns Hop. Hosp., 36:212, March, 1925.
15. Scarff, J. E.: Aseptic End-to-End Suture of the Intestine. Ann. Surg., 83:490, April, 1926.
16. Shoemaker, J.: Some Technical Points in Abdominal Surgery. Surg., Gyn. & Obst., 33:591, Dec., 1921.
    Operative Treatment of Obstruction to Growth in Descending Colon. Surg., Gyn. & Obst., 45:359, Sept., 1927.
17. Stone, H. B.: Personal communication.
18. Whipple, A. O.: Advantages of Cecostomy Preliminary to Resection of Colon and Rectum. J.A.M.A., 97:1962, Dec. 26, 1931.

DISCUSSION (*Abstract*)

Dr. A. G. Brenizer, Charlotte, N. C.—Since the operation of intestinal anastomosis carries with it more instruments and more names than any other operation in the whole field of surgery, as soon as I saw Dr. Tyler's instrument and the Shoemaker or Pringle or Bainbridge clamps, I had a longing desire to make myself one, using the very thin Pringle blades and a Carwardine screw to hold the clamps together instead of a Hoffman cut-off. Then we should have had the Brenizerische modification of the Pringlerisches-Carwardinisches-Tylerisches apparatus.

Halsted published, in 1921, a tying and burning of the bowel ends, bringing together the closed ends and puncturing the double diaphragm with a housed knife. Shoemaker, in 1921, clamped on the mucosa after cutting through the serosa and muscularis and cuffing this layer back, severed the mucosa and sewed the cuffs over the clamps. Highsmith, in 1923, used a silk worm gut loop to close Halsted's abutted ends and when abutted withdrew it after cutting. Kerr, in 1923, used a basting stitch after clamping and tucked the shelf in. Both Horsley and Stone have had obstruction from the too widely invaginated shelf. Fraser and Dott, in 1924, used a guillotine ligature, still adhering to the Halsted abutted closed ends, and reported an obstruction. Pringle, in 1924, employed clamps with very narrow blades, but could not cut to the mucosa without sometimes entering the bowel, therefore crushed the whole bowel and sewed the plications of the bowel over the clamps, stating that the mucosa need not be closed separately, nor should the crushed shelf be too wide, since Fraser and Dott had had an obstruction by the broad shelf. Shoemaker, again in 1927, employed the narrow blades of Pringle, but still on the mucosa. Tyler has twin clamps flat on the opposing sides and beveled on the bowel side, but not so narrow as the Pringle or Bainbridge blade, held together with a Hoffman cut-off. There are many devices for holding twin clamps together, not only to keep them from shifting apart, but to prevent sliding up and down. The Carwardine pin and screw on the handles or Narath's ratchet and screw on the shanks are good.

I have thought, quietly to myself, why use a special instrument at all? Why not employ an ordinary pile clamp as the most powerful bowel crusher and making the narrowest ledge? The crushed portion is so well crushed that it is translucent and remains adhered after crushing and burning on the removal of the clamps. If one does not feel sure that the crushed end will remain closed from cohesion alone, this may be assured by the application of little V-shaped wires, as applied to cerebral vessels, or a through and through strand of fine catgut clamped at each end. The little V-shaped wires or fine catgut can be opened up with thumb and finger invagination after the bowel is anastomosed.

If one still cares for a fancy technic, a von Petz clamp, which is a sort of a cross between a Payr crushing clamp and a mechanism for inserting a double row of staples across the bowel, one might follow Bancroft, who has exhibited such an instrument and who has shown by x-rays that these staples persist *in situ* for a considerable period of time and are gradually extruded. An autopsy, six months after operation, showed that there was no foreign body reaction about a staple which still remained in the intestinal wall.

More important than how you do the anastomosis is where you do it, on the right colon or the left. A one-stage operation can be done on the right side with a mortality of about 10 per cent, on the left side with double that mortality. The only way to bring the left side mortality down to the level of the right side is to drain the proximal segment of the colon by a cecostomy or colostomy beforehand or at the time of the operation. Cheever reports, from a series at the Brigham Hospital, that the mortality rate for 31 resections of the colon with preliminary colostomy was 9.6 per cent, while for 47 resections without colostomy it was 25.5 per cent. John Gibbon (*Annals of Surgery*, July, 1932), reported 20 cases, using the Kerr basting stitch in 17. He remarks: "It will be seen in the table that I have done five resections without a cecostomy. One of these cases died of peritonitis and I have a feeling he might have lived had I done a cecostomy."

The paramount obstacles to success are infection and obstruction; the bowel wall may be teeming with bacteria and the blood supply may be poor from certain anomalies in vessel anastomoses, particularly in the left colon. The bowel content becomes quickly hardened and the combination of bacteria, poor blood supply, temporary lameness from operation, gas distention and hardened fecal matter may be responsible for a leak late in the postoperative course. Retroperitoneal cellulitis, local abscess formation and peritonitis account for most of the deaths following surgery of the colon and these infectious invasions cannot always be forestalled by any method of so-called aseptic anastomosis. It is questionable, at least, whether one should ever be tempted to do an anastomosis, particularly on the left side of the colon, as can be done on the right side, without a preliminary drainage of the proximal segment.

Dr. Lloyd Noland, Birmingham, Ala.—As Dr. Tyler has already said, the multiplicity of methods for so-called aseptic anastomosis of the colon is a very definite indication that none of them is entirely satisfactory. I have done a number of anastomoses, using the Parker-Kerr technic with fairly satisfactory results, which I believe would have been even better had I been using a clamp with a narrower blade.

Dr. Tyler (closing).—These clamps were presented to this Section last year in a discussion of Dr. Horsley's paper on "Cancer of the Colon." At that time I urged the use of preliminary colostomy or ileostomy before any resection of the colon.

The bevel on the jaws reduces the invaginated cuff to the width of that obtained by Pringle's clamps. This I have demonstrated by actual measurement.

The clamps are still in the experimental stage. I believe the jaws having tongue and groove will be finally chosen, for the tips will then not be separated when compressing the bowel wall.

One point in technic: a tractor suture at the mesenteric border permits easy removal of the clamps.

I wish to stress two important features in anastomosis of the colon:

(1) The blood supply is not so generous as in the small bowel. A point for suturing must be selected where the blood supply is adequate; otherwise, despite a perfect suture-line, sloughing will occur, and fatal peritonitis will follow.

(2) The wall of the colon is thinner than that of the small gut. Hence, extra care in handling must be used to prevent injury.

THE DUODENUM: A DIAGNOSTIC PROBLEM*

By ARTHUR W. WHITE, M.D., F.A.C.P.,
Oklahoma City, Okla.

The general practitioner as well as those of us who are especially interested in conditions referable to the upper abdomen must be constantly impressed by the remarkable number of patients who may be grouped under three headings: first, those indefinite cases presenting unclassical symptoms, such as "coated tongue," "variable appetite," "flatulence," "uneasiness in stomach when working," and other vague symptoms which individually give no positive evidence of the character of the disease, which do not force attention in any definite direction, yet the patients present some predominant symptom that leads to the diagnosis of disease of the stomach, gallbladder or pancreas. Second, there is that class of patients which has been intelligently and accurately treated or successfully operated upon for some definite lesion of one organ, for example, the gallbladder or the stomach, who often continue to present certain distressing symptoms and who have not received the relief to which they have seemingly been entitled. Third, there is the class which has either these intangible evidences or neurotic conditions resembling them. These patients suffer from what is commonly referred to as "neurasthenia," and they believe that some underlying cause, as for example, cancer, is responsible.

Why the duodenum, the functional and pathological disturbances of which produce a wide range of symptoms, probably the most protein in their presentation of all upper abdominal troubles, has been treated with great indifference, is difficult to understand, and can be explained only by the difficulty of obtaining direct or positive data pertaining to this organ. The importance of the subject will readily be conceded by all who have any inkling of the frequency of the lesions of this very important organ.

Diseases of the duodenum, except ulcer, may be divided into two general types: duodenitis and periduodenitis. The first includes both inflammatory and chemical irritations; the second, adhesions which unite the duodenum with surrounding tissues, or conditions without the organ which mechanically affect its function.

Duodenitis is most often chronic and presents a syndrome based on the chemical state of the gastric secretions, except when it complicates a periduodenitis. Hyperchlorhydria is the rule. Hence, a suggestive ulcer syndrome is common. The symptoms, however, are not constant. They do not occur at fixed hours every day during a limited period as in ulcer, but are intermittent, extending over a long period, and may be relieved by any type of food or medicine, by acids or alkalis. They are often accompanied by vomiting, which rarely occurs in ulcer. Vomiting is especially common in those cases with marked ptosis of the stomach. Belching of gas in many cases is as pronounced as in the average chronic gallbladder case. The appetite is usually normal or increased. There is no loss of weight until the patient, associating his symptoms with food, becomes afraid to eat. Gastric analysis usually shows a relative hyperchlorhydria. There is often more than the expected amount of bile; food retention does not occur, but hypersecretion is the rule. Physical examination reveals little except tenderness over the right epigastrium, not up under the costal margin as in gallbladder disease. However, when associated with a gastritis

*Read in Section on Gastroenterology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

the tenderness extends over the epigastrium generally.

Nagel[1] reported, two years ago, 26 cases diagnosed ulcer, 6 of which had pronounced hemorrhage, which on careful examination proved to be gastritis. Dusel,[1] in 1924, reported 15 cases giving a typical ulcer history, in which, on careful exploration, no ulcer was found, but the peculiar arrangement of the blood vessels was present which was found by O. Muller[1] to be present in every case of peptic ulcer. The fluoroscopic examination exhibits a duodenum which has a tendency to be stringy, but may occasionally show a temporary dilatation with slight reverse peristalsis. The emptying time, however, is normal, no apparent delay in the passage of the barium being found. The general outline of the duodenum is quite irregular.

Periduodenitis may be considered in the light of partial obstruction according to the obstructing agent, which may be either congenital or required, or according to its location. This may be classified as: biliary periduodenitis, supra-mesocolic periduodenitis, sub-mesocolic periduodenitis, and compression of the third portion of the duodenum by the mesenteric vessels.

The occurrence of structures, variously described as veils, adhesions, or bands, in the upper right quadrant has long been known.

The ligament "hepatico-duodenale" was described by Huschike in 1845. Following this a number of anatomists have described various bands. Cole[2], in 1922, made a careful roentgenological study of this condition. As far back as 1907 Sir Arbuthnot Lane[3] reported finding, "adhesions that close or angulate the duodenojejunal junction". In 1908, the Mayos described a band or adhesion between the transverse mesocolon and the first jejunal loop, which has since been known as the Mayo band. Recently Sloan[4] reported some studies on "Mayo's band, the stasis produced by it, and its relation to duodenal ulcer." Draper and Johnson[5] call attention to the fact that "abnormal stenosis induced by atypical placements of the great omentum upon the colon are transmitted to the duodenum through the transverse mesocolon", and further, "that the tendency is heritable and subject to the Mendelian law."

The most complete and practical work in this field has been done by Duval[6] of Paris, whose publication has but recently appeared. Despite the work done over a long period, and despite its importance, this condition, especially the clinical side, is not well understood by the profession at large.

The periduodenitis of biliary type is most often associated with a pericholecystitis and frequently does not appear until after operation. It may, however, be produced by a hepatico-duodenale band. The diagnosis in this type may be very difficult to establish, particularly if the symptoms occur before the operation has been done. Likewise it is very difficult to differentiate stenosing periduodenitis and pylorospasm. In those cases of gallbladder disease without attacks of acute colic, in which the pain is referred along the duodenal course, with or without jaundice, it is almost impossible to determine whether the pain is due to the gallbladder or duodenum alone. Headache, often of the migraine type, is a most common complaint. In fact headache of some type, occurring at more or less regular periods, is an outstanding symptom. Dizziness, too, which may or may not be associated with headache, is commonly complained of.

Careful x-ray studies should be made and the fluoroscope is the ideal instrument for locating the trouble. The duodenum does not fill well at any time during the examination. The barium, under pressure, distends the cap first in one place and then in another on both the lesser and greater curvatures, but complete filling power never takes place.

In the supra-mesocolic type described by Duval[6] there are two kinds of offenders: first, the veil which spreads out over the cap and often over the first and second portions of the duodenum. This veil is quite thin in places and permits an irregular dilatation of the duodenum, giving the appearance of multiple diverticula. In the second condition is found a true band or bands holding the cap snugly to the liver and constricting the duodenum at various places below the cap. Above and below the constricted areas, the duodenum is dilated. This condition is most often congenital and may exist for many years without giving any signs of trouble. When the symptoms occur they may be those of obstruction, or if the constriction is marked, they may be those of acute toxemia.

Taylor[7] reports a child of 11 years and one of 8 years who were operated upon for this type of trouble. Kerley[8] observed in a series of 100 children suffering with various types of nutritional and digestive disturbances a large percentage of cases with x-ray evidence of periduodenitis.

Sub-mesocolic periduodenitis, or interference with the emptying of the duodenum by pressure on or constriction of the organ in its third portion at the duodenojejunal angle, is more readily recognized, since it produces more marked symptoms than the other groups. The symptoms may be produced by definite bands, as

for example, the ligament of Trietz or the Mayo band. Duval[6] and Taylor[7] report this as the least common variety, although Sloan,[4] in 1923, reported more than 300 cases in which he proved the presence of constricting bands. In the majority of these cases the Mayo band was the most common cause of obstruction. Incidentally, he found 52 cases of associated peptic ulcer. From this he concludes that partial obstruction may be a causative factor in the production of an ulcer.

Again, obstruction in varying degrees in this region may result from chronic compression by the mesenteric pedicle. This type is very commonly seen (when borne in mind) and produces quite classical evidence. The mesenteric pedicle, or the duodenal artery, produces a compression of the duodenum in its third or fourth portion, and this compression results in a retrodilatation of the duodenum which may extend back to and include the stomach. The same condition which occurs acutely after operation is known as acute postoperative dilatation of the stomach.

This condition has been referred to and described by numerous writers since 1900, including Moquot, first, followed by Byron Robinson, Finney, Bloodgood,[8] Kelllogg,[9] and many others. The compression occurs in the mid-line at the level of the mesenteric pedicle, where the superior mesenteric passes over the anterior surface of the duodenum. The duodenum passes through an arterial crotch, closed above by the branching from the aorta of the superior mesenteric artery and occasionally by its branch, the colica-media. This vessel always leaves a mark and often a furrow or deep groove where it passes over the duodenum, so that it might be said that partial obstruction, due to this condition, is merely an accident or an exaggeration of the normal condition.

The symptomatic result of compression of this portion of the duodenum may appear at any stage. Dubosc[6] reports one at the age of 3 years; Christian[6] one at the age of 65. Doubtless many young people and children present symptoms which may not assume therepeutic importance for a long period. Probably the most important conditions precipitating this type of trouble are ptosis and loss of abdominal fat which may bring about a ptosis not already existing, for example, of the right kidney. This may lead to traction on the colica-media by displacement of the ascending and transverse colon.

Albrecht[10] demonstrated, on the cadaver, that traction downward and backward on the mesenteric root converts constriction into obstruction. Muller also found it to be almost impossible to increase compression on the duodenum by this method in fat people until the fat had been removed from around the mesenteric root.

The shape of the duodenum may play an important part in the developing of this type of trouble and may explain, in at least a part of the cases, the period of development. In infancy the duodenum is usually circular or "C" shaped until about the seventh year (according to Crolin[11]), after which time it takes on an "U" or "V" shape. This makes it possible for obstructive interference to occur, especially when ptosis to any degree appears, which increases angulation, particularly at the duodenojejunal junction. For years we have been more or less baffled by the so-called ptosis cases because of varying emphasis on one organ or another within the syndrome. Some patients seemingly having definite gallbladder trouble, others present more or less definite evidence of peptic ulcer or possibly pancreatic disease, but show inconstant symptoms and all are relieved or definitely affected by position. A careful comparison of the picture presented by general ptosis, with that found in a demonstrable duodenal dilatation, may help us to understand that the indefinite syndrome presented by ptosis may be, in the last analysis, produced by the duodenal condition, and this may also explain why rest in bed or a properly fitting abdominal support gives marked relief to the patient.

The symptoms of compression of the third portion of the duodenum, when present to any degree, are quite plain, although they may vary in intensity. In the pronounced cases the outstanding symptom is vomiting of bile, often in enormous quantities. This is the condition which often occurs following a gastro-enterostomy, because of adhesions formed in this region, with or without the presence of a gastrojejunal ulcer. Vomiting is not continuous, but occurs at intervals, at times following attacks of severe pain, and at times, in the interval between attacks of pain. Some patients have no vomiting, but a more or less constant nausea, while others have this sensation between attacks of vomiting. In the cases in which there is no emesis a considerable quantity of bile is found on aspirating the stomach. This is considered by Bloodgood[8] as an infallible sign of duodenal stenosis.

Pain may be very severe during the attack and intermittent. In some cases it is moderate and constant. There is often a sensation of

weight or tightness in the epigastrium, which usually appears promptly after meals, although in some patients it is delayed for an hour or two. The time of appearance seems to depend on the presence or absence of a hyperchlorhydria, a low hydrochloric acid being the rule, in spite of the tendency to retention in the duodenum or in both the stomach and duodenum.

The pain and tenderness are situated in the right epigastric area, to the right of the median line. The tenderness on pressure and often the pain is absent with the patient in the prone position, although if the compression is marked and produced by a definite constricting band, posture will not relieve it. Relief can usually be brought about by elevating the abdominal contents by manual pressure, if no band is present. The hand is placed over the abdomen, below the umbilicus, and pressure is exerted upward, backward, and to the left, thus relieving the traction of the duodenal vessels and releasing the duodenum. This is a most important diagnostic sign, especialy if this maneuver stops the churning motion of the duodenum while it is under observation with the fluoroscope.

The appearance of these patients is suggestive of grave anemia, either primary or due to a chronic process. Rarely, however, does the blood count or hemoglobin fall below normal. Kellogg[9] states that

> "The hemoglobin and red cell count are increased but there is a lowering of the blood chlorides with an increase in the carbon dioxide carrying power and an increase in the non-protein nitrogen, in proportion to the severity and duration of the duodenal dilatation and consequent absorption of toxic proteose."

The x-ray findings in this group are quite characteristic. With the fluoroscope or with serial films the distal portion of the duodenum is seen to be dilated and reverse peristalsis alternates with direct. Often the pylorus can be seen to dilate and barium regurgitates into the stomach. Barium retention, at least in the duodenum, is the rule. In incomplete stenosis, produced by the mesenteric pedicle, the appearance is the same as in the case of adhesions, except that the dilatation above the bands does not stop abruptly at the mid-line and is relieved by change of position or by elevating the abdominal organs.

It must be borne in mind that the existence of this condition over a period, regardless of cause, produces marked constitutional disturbances, loss of weight, weakness, dry skin, frequently mild jaundice, and various nervous manifestations. Whether these later symptoms are produced directly or are secondarily due to the associated colon condition, which is always present, is problematical. In any event, the original condition must be changed. Other complications are fairly common, for example: pancreatic disease, cholecystitis, duodenitis, and duodenal ulcer, any of which may cloud the picture and make the recognition of the duodenal abnormality difficult. Thus, in the treatment of these cases, it is of utmost importance to determine if possible whether the obstructive interference is due to adhesions or to pressure by the mesenteric pedicle. The first, if the condition is pronounced, is always surgical, as obviously the band cannot be removed otherwise; the second is rarely surgical. Changing the position of the organs of the abdomen to relieve traction upon the vessels which compress the duodenum and caring properly for any associated or resultant pathological or functional disease, comprise the only plan which can offer any promise of relief for these patients. However, there are doubtless many exceptions to both of these rules. For example, the pressure of the mesenteric vessels might be sufficient to require a duodenojejunostomy, inasmuch as the change of position might not give necessary relief. On the other hand, the relief of traction, together with dietary management, may, in a goodly number of cases, relieve the compression for all practical purposes. Chattuck and Imboden, within the past few months, have reported 46 cases comprising all types of duodenal compression. Of these only 8 came to operation, the others, of different types, could be relieved without surgery.

In conclusion, I am constrained to emphasize the importance and frequency of both duodenitis and periduodenitis caused by mesenteric pressure. I urge a careful study of the cases presenting symptoms referable to the upper abdomen, particularly those which are not classical. In all cases associated with ptosis, in addition to dietetic and medicinal management, special attention should be paid to the mechanical defects, that is, to the correction of misplacements, by accurate support of the abdomen. Traction on the mesentery should be relieved and measures should be used which tend to increase the amount of abdominal fat.

BIBLIOGRAPHY

1. Hurst and Stewart: Gastro and Duodenal Ulcer, 1929.
2. Coie: Veils in Right Hypochondrium. Amer. Jour. of Roentgenol., 9: 1922.
3. Lane: Chronic Intestinal Stasis and Cancer. Brit. Med. Jour., 2: 1923.
4. Sloan: Partial Obstruction of Duodenum as a Cause of Ulcer. J.A.M.A., 80: 1923.
5. Draper and Johnson: Amer. Jour. Surg., April, 1931.
6. Duval, Roux and Beidler: The Duodenum, 1928

7. Taylor: Anomalous Abdominal Membranes. Ann. Surg., 75: 1922.
8. Bloodgood, J. C.: Dilatation of Duodenum in Relation to Surgery of the Stomach and Colon. J.A.M.A., 59: 1912.
9. Kellogg: Chronic Duodenal Obstruction. Ann. Surg., 73: 1931; Amer. Jour. Surg., Aug., 1931.
10. Albrecht and Glenard: Arch. f. Path. Anat., 159: 1899.
11. Jordan: Chronic Intestinal Stasis, 1923.

DISCUSSION (*Abstract*)

Dr. LeRoy D. Long, Oklahoma City, Okla.—In the majority of instances it is possible with proper fluoroscopy to determine the size of the duodenum. The cases which I have operated upon showed very definite dilatation of the second and third portions of the duodenum which was recognized in the preoperative x-ray examination. Some men are inclined to be a little doubtful as to the existence of these enormously dilated duodenums. In those upon whom I have operated there could be no question as to the degree of dilatation present. In one instance a large band from the liver was stretched tightly across the transverse duodenum. Severance of the band removed the obstruction.

In two other cases of enormous dilatation, no apparent cause of obstruction was found except pressure by the mesenteric vessels as they crossed over the duodenum. One of the cases Dr. White showed was a girl who was in the hospital on the medical service. Food was not retained. She had been vomiting practically everything taken for several weeks. We operated upon her and did an anastomosis of the dilated portion of the duodenum to the jejunum, thereby diverting the intra-intestinal flow. I have followed her for some time and she is gaining weight and doing very well. While most of these cases receive benefit from proper abdominal support, exercises and the increased fat resulting from correct nutrition, there are a few in whom the obstruction is nearly complete and these will not be relieved by medical means, but require surgery.

Dr. Ernest H. Gaither, Baltimore, Md.—I am convinced that duodenitis and periduodenitis exist. However, much of the evidence presented in favor of their being entirely responsible for the symptoms described is invalidated by the very indefinite findings; also by the fact that many similar complaints may be laid to demonstrable evidence of disease in other tissues and organs, adjacent or remote.

It is obvious that duodenitis and periduodenitis are usually secondary to other pathological conditions, and this rather militates against a definite diagnosis. Most authorities agree that x-ray and other investigations frequently fail to supply evidence upon which an undeniable diagnosis can be made. It should be emphasized, however, that the lack of pathognomonic clarity should speak for, and not against, further investigative work in this domain.

The suggestion that a five-hour gastric residue not accounted for by the usual history and investigative methods should make one suspicious of duodenal stasis is of possible value. It has been asserted, I think correctly, that numerous cases presenting variable inflammatory, spastic and toxic symptoms indicative of gastric disease, and diagnosed as functional dyspepsia and neurosis, are in reality produced by duodenitis and periduodenitis, resulting in duodenal stasis. In many of these cases we are not aided by the use of the x-ray, and this fact, added to bizarre, unusual and uninterpretable symptoms, often makes the diagnosis difficult, or even problematical.

The variability and peculiar character of symptoms due to these entities cause one to look askance at a definite diagnosis of duodenitis and periduodenitis. These conditions are difficult to diagnose and are unfortunately very resistant to successful therapy.

I am in complete agreement with the author in his inability to understand why the question of duodenitis and periduodenitis has thus far failed to interest the internists; it is only one of many inexplicable problems in medicine.

Duodenitis with its accompanying persistent irritability and spasm, and periduodenitis causing mechanical disturbances, are undoubtedly responsible in many cases for the diagnoses: duodenal ulcer, functional dyspepsia, neurosis, hepato-biliary disease, and a host of other intra-abdominal lesions. As yet there is no symptom-complex of particular diagnostic value. That should not deter us, however, from further minute study of these pathologic entities; indeed, it resolves itself into a splendid challenge to roentgenologists, bacteriologists, and those interested in the chemistry of the blood.

I am not convinced of the efficacy of palpation in these cases, because of the sensibility or lack of it in many structurally pathologic or non-pathologic conditions in this area. I have never been able to recognize the value of the finding stressed by various authors, that is, the discovery of tenderness at the right of the median line in the mid-epigastrium, as indicative of duodenal disease.

In cases of marked malnutrition, constitutional inadequacy and maximum ptosis, presenting a varied symptom-complex, including signs of toxemia, it would seem very helpful to consider, at least, the possibility of duodenal stasis, the drag exerted by the prolapsed stomach being the factor inducing an ultimate duodenitis. In cases of pancreatic, hepato-biliary and gastric disease, a spastic, irritable duodenum may conceivably be playing no role whatsoever; and this fact again emphasizes the necessity of conservatism in an unqualified diagnosis of duodenitis when a functionally deranged duodenum enters into the picture.

Nickel, after a very exhaustive study, concludes that duodenitis is produced by a streptococcus. It is interesting to note that Judd is of the opinion that duodenitis does not develop into true ulceration, while the opposite view is held by Konjetzny.

As for treatment, there should be general upbuilding therapy, abdominal support, elevation of the foot of the bed, and a bland diet which places the least burden upon the stomach and duodenum. Should these measures fail, recourse to surgery is indicated.

Finally, I wish to repeat my conviction that the entities under discussion do exist; but because of contradictory findings and the lack of a clear-cut symptom-complex, we should make most exhaustive studies and apply much careful thought before labeling a case duodenitis or periduodenitis.

Dr. White (closing).—These cases are more common than is usually considered. They are responsible for many of the vague, intangible symptoms that can be mistaken for those due to definite pathological conditions. They are readily recognized if one is on the lookout and promptly relieved when they are not due to adhesions.

OSTEOGENIC SARCOMA*

By HUGH JETER, M.D.,
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Primary osteogenic malignancies have many characteristics, which, if recognized early, aid greatly in the handling of the cases. The high rate of mortality and the frequency of similar bone lesions suggest the importance of their study. In this report we have selected the cases which are primarily osteogenic, and have not included the fibrosarcomata, neurosarcomata, and other secondary malignancies. It is our belief that secondary tumors are too frequently called primary bone tumors because the roentgenological examination of the region reveals bone disease. Fibrosarcomata may arise from bone or periosteum; Ewing's tumor from endothelium of bone; myelomata from bone marrow; angiomata from blood vessels and others from near-by structures. These do not fall properly into the class of primary osteogenic sarcomata.

It is the purpose of this paper to emphasize that osteogenic sarcoma is a definitely recognizable lesion, giving a characteristic syndrome, including clinical, roentgenological and histological changes. The 15 cases reported herein were diagnosed osteogenic sarcoma by the clinical staff, the roentgenologist and the pathologist; and have been registered as such by the Bone Sarcoma Registry of the American College of Surgeons.

Etiology.—No definite cause of bone sarcomata is suggested in this group of cases. Nearly all the patients were school children and the majority of them lived in rural communities. Of the 15 cases, 5 gave a plausible history of trauma as having been associated in some part with the onset; 2 gave a remote history of trauma; and 8 gave no history whatever of trauma. None was preceded by an inflammatory lesion. Martland[1] suggests a radio-active substance as a cause. There is no such exposure in any of our cases.

Age.—Our experience indicates that osteogenic sarcoma is a tumor of the adolescent, occurring at the age of development of the metaphysis, the predominating site of the tumor. Bloodgood, Geschickter and Copeland[2] state that "This entire process, which normally is gradual and orderly, is distorted and tremendously hurried and exaggerated by the etiological factors that precipitate the malignant growth."

The average age of occurrence in six females was 16.6 years, in nine males, 16.9 years. The range of age was from 12 to 25 years, there being only one case over 18 years of age.

Incidence.—These cases have been admitted to the State University Hospital during the past six years, in which time we have had 3,066 admissions, not including re-admissions, which gives approximately 0.005 per cent, or about 5 cases for each 1,000 admissions. This includes admissions to the Children's Hospital, which has a heavy orthopedic service.

Sex.—Boys are affected slightly more frequently than girls, there being in our group 9 boys and 6 girls.

Site of Tumor.—In each of the 15 cases, the tumor occurred at the end of a long bone and was apparently of metaphyseal origin. This is in accordance with the belief expressed by Bloodgood that bone sarcoma arises from the metaphysis. Roentgenologically, some tumors appear slightly below the epiphyseal line and others slightly above. Nearly all tumors involved both the end of the shaft and a portion of the epiphysis, but none appeared limited to either the shaft or the epiphysis. Thirteen cases, or 86 per cent, originated near the knee joint as follows: upper end of tibia five, lower end of femur seven, upper fibula one, and the other two cases originated in the upper end of the humerus.

Metastases.—Thirteen of the 15 cases had lung metastases. Two cases are recent and their outcome is not yet known. The average duration of time from the period of onset to demonstrable metastases was 7.6 months. Of course, metastases occur long before they can be demonstrated by x-ray. It is also evident from our study that metastases occur in the lung many times without clinical signs. Of 8 cases in which the upper or lower extremities were amputated, and which returned or reported regularly for x-ray examination, metastases occurred from one to eleven months following the amputation. The average period was 4.5 months. There was no metastasis at the sight of amputation in these cases, and none of them showed definite evidence of metastasis to any part except the lungs. The majority of the cases died outside the hospital and only one case came to autopsy. This patient had many pulmonary metastatic lesions without evidence of metastasis elsewhere. It is,

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*From the Department of Pathology, State University Hospital.

therefore, our observation that metastasis to parts other than the lungs is unusual.

Other Diagnostic Features.—The age of the patient and the exact location of the bone lesion are very important points. The deformity and symptoms often are almost negligible at the onset. Roentgenographs show either osteolysis or osteogenesis, and in most cases careful study reveals both conditions. Anteroposterior and lateral views show the lesion to be both cortical and medullary, and in the region of the metaphysis. Often there are radiating spicules of new bone which stand out at right angles to the long axis of the bone. The periosteum is involved, showing elevation, thickening, sclerosis, and other evidence of irritation.

Histologically, the examination of the noncancellous part of the tumor is sufficient. The picture is that of embryonal or immature types of bone cells ranging from fibroblasts, all types of osteoblasts and cartilage cells up to fairly well developed bone trabeculae. The predominating type cell depends upon the selection of the field of the tumor, but all together, the large spindle cells are most abundant. This tumor should not be easily confused with other types of malignancies, but may be confused with nonmalignant osteogenic reactions.

It is our practice to review carefully the clinical and roentgenological features as well as the histological picture before a diagnosis is made.

Treatment.—Twelve cases had amputation followed by deep x-ray therapy. One refused treatment, one had x-ray only, and one died suddenly following amputation. Twelve of the 15 cases are dead. The 3 cases which are living occurred in the past eight months and their outcome is not yet known. In other words, we have a mortality rate of 100 per cent regardless of the treatment. Geschickter and Copeland[3] report 6 per cent cure in a series of 87 cases, but remark:

> "The striking feature in the cases in which cure was obtained is the age of the patient, which in three or four cases was thirty years or over."

It seems to be the consensus of opinion from reports of various localities that there is an occasional cure. Amputation and x-ray treatment were used in our cases with the hope of palliation.

Prognosis.—The average duration of life from the onset of illness to the time of death in the twelve cases was twelve months. The one case which refused any type of treatment lived nine months.

Case 1.—J. F., a white school boy, 17 years of age, admitted to the University Hospital March 12, 1931, complained of pain and swelling below the right knee. There was no history of trauma and the pain and swelling were both insidious, but the pain became very severe about 1 month before admission.

Physical examination revealed a well developed and nourished boy with a slightly reddened, very firm and non-movable area below the left knee. There was good motion of the joint, but moderate atrophy of the leg muscles.

Laboratory examinations, including Bence-Jones protein and Wassermann, were unimportant.

X-ray examination revealed an osteolytic process involving the metaphyseal region of the upper end of the left tibia, There was very little evidence of osteogenesis and no involvement of the joint surfaces.

The x-ray diagnosis was osteogenic sarcoma.

X-ray of the chest March 12, 1931, revealed no evidence of metastasis. Mid-thigh amputation was performed March 19, 1931.

Pathological examination showed the characteristic histological picture of osteogenic sarcoma with large spindle-shaped cells predominating.

The stump healed nicely and the patient returned home in excellent condition on April 16, 1931.

Case 2.—J. E., a school girl 15 years of age, admitted to University Hospital May 5, 1929, complained of pain and swelling of the left lower thigh. She gave a history of a minor injury 4 months previously with pain, followed by swelling, developing 2 weeks later. The pain and swelling grew progressively worse and at the time of her admission she was unable to walk.

Physical examination revealed a well developed and poorly nourished girl with a fusiform enlargement 18 inches in circumference above the left knee. The circumference of the corresponding portion of the right leg was 10 inches. The tumor was not tender, was very firm in some areas and semi-fluctuant in others.

X-ray revealed a pathological fracture several inches above the knee joint and evidence of considerable osteogenesis and osteolysis with characteristic right angle spicules of bone-like material.

The x-ray diagnosis was osteogenic sarcoma.

Chest films revealed no evidence of metastasis.

Laboratory examinations, including Wassermann and Bence-Jones protein examination, were unimportant.

The left leg was disarticulated at the hip May 20, 1929.

The pathological diagnosis was osteogenic sarcoma.

Postoperative treatment was uneventful. The patient returned home and died February 6, 1930, 13 months following the onset, with metastasis of the lungs.

Case 3.—W. J., a white school boy 12 years of age, entered the University Hospital March 4, 1931, giving a history of having been kicked on the leg by a horse. Two or 3 weeks later he had a throbbing pain and swelling of the distal portions of the thigh.

Physical examination revealed a large, symmetrical tumor of the distal end of the right thigh, which was firm, fixed to the bone and moderately tender.

Laboratory examinations, including Wassermann and Bence-Jones protein examination, were unimportant.

X-ray examination showed no evidence of osteolysis

and osteogenesis at the metaphysis. The x-ray diagnosis was osteogenic sarcoma.

Amputation was performed on February 20, 1931.

The pathological diagnosis was osteogenic sarcoma.

Deep x-ray therapy followed amputation. The patient died 5 months later with metastasis of the lungs, 6 months following the onset of the first symptoms.

Case 4.— T., a white single girl 20 years of age, entered the University Hospital January 19, 1931, with a complaint of pain in the knee of 8 weeks' duration, which had grown gradually more severe. Swelling was first noticed 4 weeks previously.

Examination revealed a small, very hard, non-movable tumor of the upper end of the tibia.

Laboratory examinations, including Wassermann and Bence-Jones protein examination, were unimportant.

X-ray examination revealed sclerosis or dense bone formation in an area of about 2 x 2½ inches. No bone destruction was noted.

The x-ray diagnosis was osteogenic sarcoma.

Biopsy showed osteogenic sarcoma (Bloodgood osteogenic sarcoma, sclerosing type containing cartilage).

The patient refused treatment and returned home, where she died 7 months later with metastases to the lungs. The total duration of illness was 9 months.

Case 5.—E. W., a white school girl 13 years of age, was admitted to the hospital June 4, 1929, complaining of a swollen, tender knee, which without known cause had begun to swell 3 months previously. It had become gradually more painful and the swelling increased until about one week before admission, when a local physician had incised the tumor and, she thought, obtained "some pus and pieces of bone."

Examination revealed a very well developed and nourished girl with a hard, tender, red, fixed mass on the outer lower end of the thigh.

Roentgenograph showed an irregular destructive and productive area of the distal end of the right femur.

X-ray diagnosis was osteogenic sarcoma.

Chest examination revealed no evidence of metastasis.

Laboratory examinations were unimportant.

Amputation for palliation was recommended, but refused. After consulting several clinics in other cities she finally had the leg disarticulated at the hip. The diagnosis was confirmed by microscopic examination. She was treated by x-ray, but died at her home November 10, 1930, 17 months after onset, with evidence of pulmonary metastasis.

Case 6.—E., a white girl 18 years of age, admitted to the hospital August 23, 1931, complained of a painful swelling of the knee of 6 months' duration. The knee had been stiff for 3 months.

Physical examination revealed a moderately obese white girl with a large, firm, irregular, slightly tender tumor of the lateral side of the distal end of the left femur. She was also in the third or fourth month of pregnancy.

Roentgenograph showed very marked bone production involving three-fourths of the border of the left femur just proximal to the epiphysis. There was also osteolysis of the cortex.

The x-ray diagnosis was osteogenic sarcoma.

Chest examination was negative for evidence of metastasis.

The leg was amputated August 1, 1931, and x-ray treatment followed. She died of pulmonary metastasis January 10, 1932. This was 2 weeks before she was due to deliver and 11 months following the onset.

It is interesting to note that pregnancy in this case seemed to have no influence upon the progress of the malignancy.

Microscopic examination showed a very cellular tumor composed principally of ovoid cells containing irregular shaped dark staining nuclei.

Case 7.—L. P., a white school girl 17 years of age, was admitted to University Hospital November 4, 1928, giving a history of having fallen 6 months previously and having injured her knee. Swelling and intermittent pain developed gradually until 1 month before admission she was unable to walk. She had gonorrhea and syphilis and had been treated for both without relief to the knee.

Examination revealed a pale, emaciated girl with a large, firm, irregular, tender tumor of the left leg just below the knee.

X-ray showed very marked bone destruction of the upper end of the tibia, extending almost to the articular surface.

The chest showed no evidence of malignancy. The leg was amputated January 11, 1932, and intense x-ray treatment given.

Histological study of the tumor revealed an osteogenic sarcoma of the chest with spindle cells predominating.

X-ray of the chest was made every month and definite evidence of metastasis was demonstrated 9 months after amputation.

Laboratory examinations were unimportant except for moderate anemia and a negative Wassermann.

She grew gradually worse and died 12 months following amputation with a total duration of approximately 18 months.

Case 8.—F., a white boy 15 years of age, admitted to the hospital February 1, 1927, stated that 3 months previously he had fallen from a tree and struck his knees on the ground. About 3 weeks later pain and swelling appeared in the right thigh near the knee.

Examination revealed a poorly nourished boy with a large tumor completely circumscribing the distal end of the right thigh. It was largest anteriorly and laterally, semi-fluctuant in some areas and moderately tender. The knee was partially flexed and stiff.

Roentgenograph revealed a large osteogenic and osteolytic lesion involving the distal end of the femur.

The x-ray diagnosis was osteogenic sarcoma.

Chest examination February 4, 1927, showed no evidence of metastasis.

The leg was amputated, followed by x-ray treatment. The stump healed and showed no evidence of recurrence, but x-ray of the chest July 6, 1927, showed evidence of advanced metastasis.

He died August 1, 1927, 9 months following the onset and 6 months following amputation.

Case 9.—N. Y., a white boy 14 years of age, was admitted to the hospital August 1, 1932, with a typical tumor immediately below the knee involving the proximal portion of the tibia. There was no history of injury.

X-ray showed advanced destruction and some bone production in the region of the metaphysis. There was no evidence of involvement of the fibula.

The patient refused treatment at our hospital, but has recently had the leg amputated at another hospital, and we are informed that the histological examination revealed an osteogenic sarcoma. The final outcome in the case is not yet known.

Case 10.—C P., a white boy 15 years of age, admitted to the hospital April 28, 1932, stated that when playing football 7 months previously he was kicked on the knee and 3 days later he received another injury to the same knee. About 3 months later, 4 months before admission, he noticed slight swelling and tenderness.

Examination revealed a poorly nourished boy with a large, tender, hard, fusiform enlargement just above the right knee.

Roentgenograph showed extensive bone production and irregular areas of bone destruction at the metaphyseal region of the lower end of the femur.

The x-ray diagnosis was osteogenic sarcoma.

Chest examination revealed no evidence of metastasis.

The leg was amputated and the patient died a few hours postoperatively, apparently as the result of pulmonary embolism.

The histological appearance of the tumor in this case was classical.

Case 11.—W. W., a white school boy 17 years of age, admitted to the hospital April 14, 1932, complained of dull pains and swelling immediately below the knee. The duration was 4 months. There was no history of trauma. This boy was poorly nourished and had a hard tumor the size of an egg fixed to the medial surface of the upper end of the tibia. The leg could not be completely extended on the thigh.

Roentgenograph showed an irregular area of osteolysis and osteogenesis involving the proximal end of the shaft of the tibia.

The x-ray diagnosis was osteogenic sarcoma.

Examination of other bones and the lungs showed no involvement.

The leg was amputated April 16, 1932, and x-ray treatment followed. The stump showed no recurrence on June 23, 2 months later. He seemed in good health on August 20, 1932, and x-ray examination of the lungs showed no evidence of metastasis. We have been unable to follow the case since August and the outcome is therefore not known.

The histological picture was that of densely and heterogenously arranged, large, spindle-shaped and irregularly-shaped cells.

Case 12.—C., a white school boy 16 years of age, was admitted to the hospital May 9, 1932, with a history of having injured his leg on a plow 7 weeks previously. Two weeks following the injury, pain and swelling developed and grew gradually worse until his admission. He had lost 22 pounds in weight in 2 months. He walked with a crutch.

Examination revealed a boy large for his age and fairly well nourished. There was a large tumor on the outer surface of the left leg just below the knee the size of an orange. It was fairly firm and fixed.

X-ray examination revealed an irregular destructive area involving the greater portion of the end of the fibula.

There was also evidence of some osteogenesis.

Chest examination showed no evidence of metastasis.

The x-ray diagnosis was osteogenic sarcoma.

Laboratory examinations, including a Wassermann and urine for Bence-Jones protein, were irrelevant.

This boy was taken to another hospital for treatment, but we have been informed by Dr. Carson, who amputated his leg, that the pathological diagnosis was osteogenic sarcoma. His progress since the operation June 1, 1932, is unknown.

Case 13.—M. D., a white school girl 18 years of age, was admitted to the hospital August 26, 1931, complaining of pain above the knee. There was no history of injury.

Examination revealed a large, moderately tender, firm, fixed tumor of the distal end of the thigh.

X-ray examination showed a large irregular destructive area and evidence of considerable osteogenesis at the metaphyseal region.

The x-ray diagnosis was osteogenic sarcoma.

Chest x-ray at regular intervals showed no evidence of metastasis until January 30, 1932, 6 months following the onset.

Laboratory examinations were irrelevant.

She was given x-ray treatment, but her progress was gradually downward and she died of lung metastasis approximately 11 months following the onset.

Case 14.—R., a school boy 15 years of age, was admitted to the hospital January 19, 1932, with a history of having 3 months previously fallen from a horse and injured his left shoulder. Swelling, pain and loss of function began 1 month following the injury. An incision, presumably a biopsy, was done 1 month before his admission and a draining sinus resulted. The patient had refused amputation at that time.

Examination revealed a well developed and nourished boy with a large fusiform tumor of the upper end of the left humerus which was very hard and rigidly attached to the bone.

X-ray examination showed an irregular osteolytic as well as osteogenic process involving the metaphyseal region.

X-ray diagnosis was osteogenic sarcoma.

Chest examination showed advanced metastasis and a pneumothorax on the right side. Please recall that the tumor was on the left humerus.

Laboratory examinations, including urine for Bence-Jones protein and a Wassermann, were irrelevant.

The child was discharged from the hospital without treatment and died suddenly January 23, 1932, 2 days later, from "extreme shortness of the breath," which we interpreted as probable bilateral pneumothorax.

The total duration was 3 months.

Case 15.—H. W., a school boy 12 years of age, was admitted to the hospital December 22, 1931, with a history of having fallen and broken the right wrist 9 months previously. Six weeks previously he had fallen while roller skating and injured the right shoulder. The shoulder had since been tender and swollen. A few days before admission he was struck by a car while roller skating, after which he was unable to use his arm.

Examination revealed a poorly nourished boy who appeared acutely ill and was having considerable distress. There was a large, tender, fusiform, semi-fluctuant enlargement of the right shoulder. The underlying skin was injected and red.

X-ray revealed an irregular destructive process involving principally the end of the humerus with evidence of osteogenesis and periosteal thickening, the entire lesion involving the greater portion of the upper one-half of the bone and soft tissues of the arm.

Six days later there was a pathological fracture.

Laboratory examinations were unimportant.

X-ray therapy, physical appliances and drugs were used palliatively.

The tumor grew very rapidly and became enormous in size. The patient died March 16, 1932, approximately 5 months following the onset.

X-ray of the chest at the time of admission showed large areas of metastasis and left pneumothorax. The pneumothorax was on the opposite side to the lesion, as in the above case.

Autopsy revealed advanced pulmonary metastasis, otherwise grossly unimportant except for the enormous tumor of the upper end of the right humerus. Microscopic examination showed an osteogenic sarcoma composed of a great variety of cells, but with a predominance of large cells with ovoid nuclei.

CONCLUSIONS

(1) Malignant tumors arising strictly from bone have certain very definite diagnostic features.

(2) If the clinical, roentgenological and histological findings are carefully studied, the diagnosis is not difficult. The responsibility of diagnosis should not rest on any single finding.

(3) Fifteen cases of osteogenic sarcomata are reported.

BIBLIOGRAPHY

1. Martland, Harrison S.: Occurrence of Malignancy in Radioactive Persons. Amer. Jour. Cancer, 15:2435, 1931.
2. Geschickter, C. F.; and Copeland, M. M.: Osteolytic Forms of Osteogenic Sarcoma, Tumors of Bone, Amer. Jour. of Cancer, Chapter VIII, 203, 1931.
3. Idem., p. 241.

DISCUSSION (*Abstract*)

Dr. Jack C. Norris, Atlanta, Ga.—The essayist gives a very accurate summary of the more important facts related to osteogenic sarcoma. The points that I would like to emphasize are related to the high death rate. It seems that the only hope for curing these patients lies in the very early diagnosis and surgical intervention. In dealing with such a lesion the greatest diagnostic aid is biopsy. Some pathologists, however, feel that it is very dangerous to section these tumors. In face of the high mortality rate I feel justified in sectioning if possible any lesion of such a nature for diagnostic procedures, followed immediately by appropriate surgery, for in this manner lives may be saved.

Dr. Clayton E. Royce, Jacksonville, Fla.—I wish to ask Dr. Jeter about pain in his cases. If I remember correctly, Ewing states that unexplained pain in the bones should call for an immediate radiologic study.

Dr. T. C. Moss, Memphis, Tenn.—In reviewing the records of the Memphis General Hospital I find that 12 cases of osteogenic sarcoma were treated during the past ten years. During that time there were 75,000 admissions to the hospital. Of these 12 cases there were 2 cases under ten years of age, 5 cases between ten and twenty years of age, 4 cases between twenty and thirty, and one case in a man thirty-six years of age. Though this is a relatively small group of cases, the incidence corresponds closely to that given by the registry of bone sarcoma. These 12 represent the unquestionable cases of osteogenic sarcoma. It was found that many cases were classified as osteogenic sarcoma which were not, but through an error of judgment they were included in that category. Some of the common errors noted are as follows:

Occasionally a diagnosis of osteogenic sarcoma is made in the case of a sarcoma of the soft tissues which approximates bone, or in the case of a fibrosarcoma which arises from the external layer of the periosteum. Since neither of these tumors arise from the osteoblast and they do not give a typical clinical, roentgenological or pathological picture of osteogenic sarcoma, there is not much excuse for such an error.

Another error observed is that of a subperiosteal hematoma which becomes ossified. Here the absence of involvement of the shaft and a quiescence of growth after a few weeks should prove valuable in arriving at a true diagnosis.

One case which proved difficult was that of an osteomyelitis which presented much bone absorption and new bone production. A biopsy from the site showed many spindle cells, mitotic figures, and the presence of new bone. In this case the pathologist who happened to be myself, was in error as to the diagnosis, and it was only after amputation of the extremity that a true diagnosis was made.

Another error sometimes made by the inexperienced is that of considering the common sarcoma of the paranasal sinuses as a bone sarcoma. This sarcoma arises from the fibrous tissue of the mucous membrane and not from the osteoblast.

Dr. Jeter (closing).—In our series, pain was not an early, predominating symptom. I believe that the amount of pain depends largely upon whether or not the lesion extends toward the joint or whether it is free from the joint. Joint pain accompanied those cases where the tumor had invaded or caused pressure on the joint structures.

There is one point which I wish to emphasize, for the benefit of the patient, the surgeon, and the pathologist: I believe it is wise for the pathologist to review carefully the clinical findings, the roentgenological features, as well as his own gross and microscopic examination before he makes a final report. This policy has aided me greatly in the study of our cases.

THE ASCARIS PROBLEM IN THE UNITED STATES*

By W. W. Cort, Ph.D.,
and
G. F. Otto, Sc.D.,
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Recent field studies on *Ascaris lumbricoides* have given some new conceptions of the distribution and the factors influencing the dissemination of this parasite in the United States. It has been found that ascaris is much more prevalent in young children, especially in those of preschool age, than in the rest of the population.[9 12] It appears to be spread chiefly by pollution of the soil close to the houses by these children. The eggs passed onto the soil, develop easily even in exposed places and infection can occur by hand-to-mouth transfer as the children play in the dooryards or by the tracking of the eggs into the houses. In this way the family usually becomes the unit of ascaris dissemination, although some important community sources of infection do occur. Thus heavily infested families are often found in a community with practically no general infestation and other families, on account of good habits of personal hygiene and a well developed household sanitation, may remain uninfested or but slightly infested in the midst of a heavily infested group. There is also an abundance of evidence from the recent surveys that even in the absence of proper household sanitation ascaris may be absent when the soil pollution is at some distance from the houses.[9 22] In fact, the low ascaris level in whole communities in which there was no sanitation seemed to be due to the habit of depositing the stools only in places outside the dooryards at some distance from the houses. Another relation that has become clear is that there is a constant spontaneous loss of worms in any group and that the only way a high level of infestation can be maintained is by constant reinfection.[11 20] Such reinfection is easily possible on account of the enormous egg production of this parasite, since a single female ascaris may produce over 200,000 eggs per day,[1 5] and because of the resistance and longevity of these eggs.[2 3 6 19 23] These and other peculiarities in the relations between man and this parasite must be given careful consideration in estimating the significance of the ascaris problem in a population group or in devising control methods.

A consideration of the knowledge that has been gained from recent surveys on the distribution of ascaris in the United States will give some of the evidence on which the statements given above are based. While cases of roundworm infestation have been reported from every state in the Union, there are only a few areas outside of the mountains of the southeastern part of the United States where a considerable proportion of the population is infested. The table and map which are included give information on the distribution of ascaris in the southeastern United States.[7 9 21] This map shows that there is a widespread infestation with ascaris in the population of the mountains of the southeastern Appalachian range extending from West Virginia to the northern part of Georgia and Alabama, and west as far as central Kentucky and Tennessee. The only ascaris infestation of any comparable significance outside this mountain belt has been found in Columbus County, North Carolina, Tampa, Florida, and in southcentral Louisiana. Throughout the rest of the southeastern United States, what evidence we have shows a low incidence of ascaris even in areas where hookworm is prevalent and where sanitation is poor.

ASCARIS INCIDENCE IN SOUTHEASTERN UNITED STATES ACCORDING TO OUR SURVEY DURING THE PAST FIVE YEARS (MALES AND FEMALES 0-14 YEARS OLD)

Area	Number Examined	Per Cent Positive
Arkansas, rural	3,149	3.04
Florida		
City of Tampa	348	36.5
Rural	1,180	6.2
Kentucky, rural	3,973	56.1
Louisiana, rural	2,474	24.9
North Carolina (Columbus County), rural	811	17.6
Tennessee		
East, rural	13,192	36.7
Central, rural	2,630	20.4
West,* rural	3,326	4.1
Virginia (southwest), rural	1,573	56.1

*Age grouping in West Tennessee is for 5-14 year group instead of 0-14.

*Read in Joint Session of the Section on Public Health, Southern Medical Association, Twenty-Sixth Annual Meeting, and the American Society of Tropical Medicine, Birmingham, Alabama, November 15-18, 1932.

*From the Department of Helminthology of the School of Hygiene and Public Health of the Johns Hopkins University. The results reported in this paper were obtained from a program of researches on ascariasis in children, conducted under the auspices of the National Research Council with the aid of a grant from the American Child Health Association.

The shaded areas are those surveyed by our group in the last five years.
The broken line including part of West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Alabama and Georgia indicates the probable limits of widespread heavy ascaris infestations.

It can be seen, therefore, that ascariasis as an important public health problem is limited to a small number of states, chiefly those southeastern states that include in their boundaries large sections of the mountains and foothills of the Appalachian range. The reasons for this peculiar distribution have been sought without success in possible relations to ascaris dissemination of physiographic, soil or climatic conditions peculiar to this mountain area. No evidence has been found of any such conditions in these regions particularly favorable for the spread of ascaris.[7 21 22] Further, a survey made last summer in Arkansas of people living in the southern Ozarks shows almost no ascaris infestation whatever.

An analysis of the conditions in the few areas outside of the mountains where a comparable ascaris incidence was found is of special interest in this connection. Our survey in Columbus County, North Carolina, was undertaken because the extensive records in the office of the State Board of Health showed that it was the only place in the State outside of the mountains of the western part where there was any significant ascaris infection. The incidence in the examinations from this county was 17 per cent and cases were found with an intensity of infestation comparable to the worst in the mountains. These cases came almost entirely from a very isolated, backward and wholly insanitated section of the county where gross pollution of the dooryards by the children occurred. In the part of the City of Tampa, Florida, where a high incidence of ascaris was found it was evident that it had been brought in by the Cuban cigar makers.[21] It was found to be maintained in this group and in other groups in close contact with them by constant pollution by the younger children of the soil in the small, moist, well-shaded dooryards. It is particularly significant that in the Tampa group some of the families with the heaviest infestation and the worst soil pollution habits, lived in houses which were connected with the modern sewage system of the city. In south-central Louisiana also it was found that the high incidence of ascaris could also be explained by some pollution of the soil close to the houses by the younger children combined with particularly favorable temperature and moisture conditions.[21]

The best evidence for the conclusion that was finally reached that the peculiarities of the distribution of ascaris in the United States are due to differences in defecation habits, came from a study of conditions in Tennessee. In the lowlands of western Tennessee the incidence of ascaris varies from 0 to 5 per cent in the different counties from which examinations were made, as compared with a high incidence in the mountainous areas of the central and eastern parts.[14] It was found, however, that the ascaris positives in the western lowlands showed a high proportion of heavy cases which were almost always grouped in families. These families had a type of infestation very similar to that found in the numerous ascaris families of the mountain areas.[22] The difference in incidence be-

tween these two sections of the state was due, therefore, to the very small number of ascaris families present in the western part. Since these families were widely distributed and most of them were permanent residents it became evident that conditions favorable for the building up and maintaining of heavy ascaris infestations were to be found in widely scattered regions of western Tennessee. Family environmental studies showed further that in the ascaris families of western Tennessee the parasite was spread as in the mountains by gross soil pollution by the children near the houses.

Why, then, in Tennessee is the number of ascaris families so much less in the lowlands than in the mountains? As an attempt to answer this question a large series of ascaris free families in western Tennessee of the same economic and cultural level as the ascaris families was studied. Soil pollution was usually found, but the stools were almost always deposited at a distance from the houses. In the absence of privies and sometimes at houses with privies the stools were found to be concentrated in and around outbuildings, in spots of cover outside the yards or in ravines at a distance from the houses. It seemed evident that in these families the absence of pollution in the dooryards was the factor that kept ascaris from spreading. These observations in western Tennessee have been confirmed in our other surveys and the conclusion seems unescapable that the peculiarities of ascaris distribution in the southern United States depend primarily on the prevalence of that particular type of soil pollution habits which have been found to be favorable for its dissemination.

The information now available not only makes it possible to define the extent of the ascaris problem in the United States, but also to determine what kind of a control program will give promise of success.

Effective drugs are now available for the treatment of this parasite.[13] Santonin is still widely used, although recent investigations have shown that it is not nearly so effective as has generally been supposed for the elimination of the worms. Oil of chenopodium is much more effective and is often used, in some cases combined with carbon tetrachloride for patients harboring both ascaris and hookworm. However, records of severe symptoms and occasional deaths have been reported following the use of this drug.[15 17] An important forward step in treating this parasite has recently been made by the experiments of Lamson and his co-workers on the use of hexylresorcinol.[4 16 18] This drug has been found to be very effective in eliminating ascarids. This, combined with its lack of toxicity, appears to make it the drug of choice. In all ascaris areas certainly effective treatment should be made widely available, especially to relieve very young children of their heavy worm burdens.

Community treatment as a control measure against ascaris, however, is an entirely different proposition. In the first place the evidence is clear that on account of the constant loss of worms a high level of ascaris infestation is kept up in a community only by constant reinfection.[20] This is well illustrated by studies in which it has been found that certain groups in the absence of reinfection rapidly lost their worm burden without treatment.[10 14] Even more striking are the studies which show that groups that have been treated will regain their pretreatment ascaris level by reinfection within six months to a year after the treatment.[11 20] All these facts indicate clearly that treatment for ascaris should be used primarily as a curative measure, and that on account of the rapidity of reinfection the attempt to control this parasite by mass community treatment cannot be justified as a public health measure.

One of the most important findings from the point of view of the health officer in the recent epidemiological investigations on ascariasis is the evidence that the ordinary program of rural sanitation fails to control this parasite. Heavy ascaris infestation has been repeatedly found in communities in which most of the houses were provided with privies. In such surveys as those reported from southwestern Virginia[9] or from Tennessee[22] it was often found that practically half of the ascaris families were provided with privies. Heavy ascaris infestation was even found sometimes in families in cities living in houses with sewer connections and modern bathroom facilities.[21] As has been pointed out repeatedly, ascaris infestation under these conditions is due to the failure of the young children, particularly those of preschool age, to use the sanitary facilities provided. This group is most subject to ascaris infestation, and when they pollute the soil near the houses they may infect other members of the family as well as reinfect themselves.

On account of the relation of the young children to ascaris dissemination, any control program must be particularly focused on this group. The efforts must extend beyond the mere introduction of privies into the community and must be centered on their use by the children. As

we pointed out to this same Section in the meeting in Asheville in 1928,[8] you can hardly expect to induce children to use privies which are inconvenient and unsafe. In our rather extensive ascaris surveys of the last five years, in which we have inspected the sanitary facilities in literally thousands of homes, we can almost count on the fingers of one hand the privies we have seen in which there was a special seat for little children. It seems to us that the introduction of such special provision for children must be the first step in any program to control ascaris. Then the next step must be intensive and long-continued instruction by nurses, health officers and schools in the proper methods of household sanitation. This instruction should center in the home and in the school. The mother must be properly instructed so that she in turn will teach the children. The building of privies, therefore, is but the first step and the real problem is to teach the children to use them.

Certainly the relation of young children to the spread of ascaris makes the control of this parasite a particularly difficult problem. There is, however, some reason for encouragement. Since rather extreme conditions appear to be necessary to keep up a high level of ascaris infestation, any improvement in sanitation or in standards of living may be expected to be soon reflected in a decrease in this level. There is, moreover, perfectly clear evidence from our surveys that in certain families, communities and in fact in some areas of considerable size, the extent and severity of ascaris infestation has been greatly reduced in recent years by programs of sanitation and by changes which tended to improve the cultural and economic level of the people.[7]

Another point that must be considered is the lack of sanitation in many of the rural schools in those areas where ascaris is prevalent. A surprisingly large proportion of the schools in these regions are either entirely without sanitary facilities or have such poor privies that soil pollution is common.[7 22] In a number of cases, definite evidence was obtained that stools scattered in the school yards and in the near-by play areas were sources of ascaris infection. Counties have been visited where almost all of the rural schools were entirely without privies. Such conditions are common and widespread in these regions and are not limited to a few localities in a few states. Teaching in sanitation and personal hygiene in the schools might be made an important factor in the fight against soil pollution habits in children. But certainly such instruction cannot even be considered until the sanitation in the schools is such as to serve as an object lesson to the pupils in proper habits. Progress has been made in the last few years in rural school sanitation in the ascaris areas, but the great amount that remains to be done stands as a challenge for increased effort by both school and health authorities.

It is questionable whether, even in those districts where ascaris infestation is the heaviest, special campaigns for its control should be organized as separate units. In many such areas, however, especially those in which there is no real hookworm problem as in most of the mountain sections, that part of the public health program which is concerned with the improvement of rural sanitation may well center its attack on the control of ascaris. The relations of this parasite are well known to the people, and they can be readily educated to understand the role that soil pollution plays in its spread. A health officer in an ascaris area can often also use the degree of ascaris infection in any population group where sanitary work has been prosecuted as a measure of the success of his labors. The presence of widespread ascaris infestation in any county is a clear indication that an intensive program for the improvement of household sanitation must be made a central feature of any health program. The majority of the heavy ascaris counties are still without any county health units. Some of them are in fact so poor that it seems almost impossible that they can ever support such units. In fact, it is clear that in the United States the ascaris problem is almost entirely a part of the general problem of improving the economic and social level of the "poor mountain whites" of the southeastern Appalachian mountains. The raising of the standards of personal hygiene and household sanitation among these people to the point where ascariasis ceases to be important must be one of the early steps in their general advancement.

REFERENCES

1. Augustine, D. L.; Nazmi, M.; Helmy, M.; and McGavran, Ed. G.: The ova-parasite ratio for *Ancylostoma duodenale* and *Ascaris lumbricoides*. Jour. Parasit., 15:45-51, 1928.
2. Brown, H. W.: Studies on the Rate of Development and Viability of the Eggs of *Ascaris lumbricoides* and *Trichuris trichiura* under Field Conditions. Jour. Parasit., 14:1-15, 1927.
3. Brown, H. W.: Further studies on the Longevity of the Eggs of *Ascaris lumbricoides* and *A. suum*. Jour. Parasit., 15:14-22, 1928.
4. Brown, H. W.: Clinical Experience with Hexylresorcinol. Jour. Parasit., 18:116, 1931.
5. Brown, H. W.; and Cort, W. W.: The Egg Production of *Ascaris lumbricoides*. Jour. Parasit., 14:88-90, 1927.
6. Caldwell, F. C.; and Caldwell, E. L.: Preliminary Reports on Observations on the Development of Ova of Pig and Human Ascaris under Natural Conditions and Studies of Factors Influencing Development. Jour. Parasit., 14:254-260, 1928.

7. Cort, W. W.: Recent Investigations on the Epidemiology of Human Ascariasis. Jour. Parasit., 17:121-144, 1930.
8. Cort, W. W.; Otto, G. F.; and Spindler, L. A.: Ascariasis in Southwest Virginia: A Preliminary Report. Sou. Med. Jour., 22:608-614, 1929.
9. Cort, W. W.; Otto, G. F.; and Spindler, L. A.: Investigations on *Ascaris lumbricoides* and Associated Intestinal Helminths of Man in Southwest Virginia. Amer. Jour. Hyg., 11:1-55, 1930.
10. Cort, W. W.: Schapiro, Louis; Riley, W. A.; and Stoll, N. R.: A Study of the Influence of the Rainy Season on the Level of Helminthic Infestations in a Panama Village. Amer. Jour. Hyg., 10:626-634, 1929.
11. Cort, W. W.; Schapiro, Louis; and Stoll, N. R.: A Study of the Reinfection After Treatment with Hookworm and Ascaris in Two Villages in Panama. Amer. Jour. Hyg., 10: 614-625, 1929.
12. Cort, W. W.; Stoll, N. R.; Riley, W. A.; and Sweet, W. C.: Studies on Hookworm, Ascaris and Trichuris in Panama. VIII. Quantitative Studies on the Distribution of *Ascaris lumbricoides* and *Trichuris trichiura* in Panama. Amer. Jour. Hyg., Mono. No., 9:161-209, 1929.
13. Hall, M. C.: Treatment for Infestation of Man with Parasitic Worms. U. S. Naval Bull., 28:1-16, 1930.
14. Keller, A. E.: *Ascaris lumbricoides:* Loss of Infestation Without Treatment. J.A.M.A., 97:1299-1300, 1931.
15. Lamson, P. D.; Brown, H. W.; and Ward, Charlotte B.: Anthelmintics: Some Therapeutic and Practical Considerations on Their Use. J.A.M.A., 99:292-295, 1932.
16. Lamson, P. D.; Caldwell, E. L.; Brown, H. W.; and Ward, C. B.: Hexylresorcinol in the Treatment of Human Ascariasis. Amer. Jour. Hyg., 13:568-575, 1931.
17. Lamson, P. D.; Minot, A. S.; and Robbins, B. H.: The Prevention and Treatment of Carbon Tetrachloride Intoxication. J.A.M.A., 90:345-349, 1928.
18. Lamson, P. D.; Ward, C. B.; and Brown, H. W.: An Effective Ascaricide—Hexylresorcinol. Proc. Soc. Exper. Biol. & Med., 27:1017-1020, 1930.
19. Otto, G. F.: A Study of the Moisture Requirements of the Eggs of the Horse, Dog, Human, and Pig Ascarids. Amer. Jour. Hyg., 10:521-525, 1929.
20. Otto, G. F.: *Ascaris lumbricoides:* Treatment, Loss of Worms and Reinfestation. J.A.M.A., 95:194-196, 1930.
21. Otto, G. F.: Ascaris and Trichuris in Southern United States. Jour. Parasit., 18:200-208, 1932.
22. Otto, G. F.; Cort, W. W.; and Keller, A. E.: Environmental Studies of Families in Tennessee Infected with Ascaris, Trichuris and Hookworm. Amer. Jour. Hyg., 14:156-193, 1931.
23. Raffensperger, H. B.: Viability of *Ascaris suum* Ova Exposed to Weather Conditions. Vet. Med., 22:221-226, 1927.

DISCUSSION (*Abstract*)

Dr. E. L. Bishop, Nashville, Tenn.—The studies of ascariasis by Dr. Cort and his associates afford an excellent example of the value of field study, both laboratory and epidemiological, as a means of increasing the specificity of control measures in the prevention of disease.

This is a day of specific measures applied to specific problems. The day of the shotgun prescription is past no less certainly in preventive medicine than in therapeutics. Hence the first problem facing the public health administrator is the definition of the problems with which he is confronted not only as to distribution and relative importance, but in regard to the availability of specific knowledge of control procedures. Where gaps in existing knowledge exist, research, either major or minor as the need may be, must precede the formation of control strategy.

It is from this point of view we have attempted to develop our work in Tennessee and hence the study undertaken by Dr. Cort and his associates proved a very welcome project to our group. Its value is perfectly apparent from the discussion he has presented. By taking his laboratory to the field of operations and combining this study with detailed epidemiological observations he has been able to discover the weak points in control procedure and to provide remedies affording effective control. He has shown that it is to the habits and personal hygiene of people rather than the apparent sanitation of the home that we must look for effective measures or rather that personal hygiene must reinforce sanitation. He has been able to suggest simple and practical ways and means of accomplishing this end.

A further point very apparent to me is the value of close cooperation and intimate relations between educational organizations and operating agencies. The first contributes much to the latter in scientific approach to practical problems and prevents purely routine methods of procedure. The latter contributes many of the facilities for study and may, if I am allowed to hint at such a thing, prevent a too abstract approach.

For myself and my associates, I wish to express our sincere appreciation of the contribution Dr. Cort has made to our knowledge of public health problems in our state.

Dr. D. M. Molloy, Guatemala City, Guatemala.—Dr. Cort says that he is unable to account for the very high prevalence of ascaris in certain sections, such as the hill sections described in his paper. An ascaris survey of the Republic of Guatemala (begun four years ago by the hookworm control service of the National Health Department and just completed last year) revealed conditions quite similar to those he describes: a very high incidence of ascaris in the high, mountainous country of the interior and a relatively low incidence in the lower valleys and coastal plains. We believe that this can be accounted for largely by the difference in the topography of the different sections. In the highlands the houses are situated on the tops of ridges or small promontories and are surrounded by very small yards, or patios. The reduced area for play naturally confines children to the immediate environs of the house. As a result, soil pollution is concentrated around the house; and since most of the houses have dirt floors, pollution may, and as Brown has shown, actually does occur in the house. In the wider valleys and level lands, houses are surrounded by large yards and gardens, thus permitting children to wander farther away from the house. As a natural consequence, soil pollution is scattered, or less concentrated, which reduces the dangers of exposure to infection.

Soil conditions also may account for the higher incidence, as well as the greater intensity, of the infection in the hill country. The sticky clay surface of the yards offers more protection to ascaris eggs, preventing their being washed away by the heavy rains. Mature ascaris eggs are carried into the house on the feet of children, as well as domestic animals, thus constantly adding to and building up soil pollution in and around the house. We feel that these two factors, topography and the nature of the soil, are responsible for the higher incidence, as well as the greater intensity of ascaris infestations in the highlands of Central America.

Dr. J. Cyril Eby, Plaquemine, La.—Dr. Cort's report shows that the "Sugar Bowl" region of Louisiana has one of the highest percentages of ascaris so far demonstrated in the United States. This high infestation may be the result of several causes: the general topography of this area is made up of alluvial and general wooded lowlands, climatic conditions with no extremes of temperature, an average rainfall of from 55 to 60 inches, and a lack of sanitation.

In the various sections makeshift privies are constructed over holes in the ground and some are built over ditches and heavy rain causes an overflow. Cesspools are the chief method of excreta disposal in houses with sanitary conveniences. But in high water these cesspools overflow into the various ditches that drain the town. In constructing sanitary pit privies in this region, efforts are made to have them banked at least a foot higher than the level of the ground to prevent inflow or overflow.

In Iberville Parish, Louisiana, during January, February and March, 1931, I had the assistance of Dr. Cort's laboratory, Johns Hopkins School of Hygiene, in examining more than 300 specimens of feces and more than 200 specimens were examined by the Louisiana State Board of Health. The total number of 529 for that period shows that the degree of positive infestation in percentage according to all ages in white was as follows: ascaris, 16.6; trichuris trichiura, 28.2; and hookworm, 3.2.

Beginning August 1 and ending September 7, 1931, 462 specimens were sent to the temporary laboratory at Jeanerette, Louisiana, established by Drs. W. W. Cort and G. F. Otto, Department of Helminthology, Johns Hopkins School of Hygiene. The percentage for both white and colored, ages 5 to 14 years, shows the following positive rates: ascaris, 19.5 per cent; trichuris (whipworm), 40.4; and hookworm, 1.1. The percentage positive for all ages showed: ascaris, 18.0; trichuris, 36.4; and hookworm, 0.6.

THE PROTECTION OF SOUTHERN PORTS AGAINST IMPORTATION OF TROPICAL DISEASES*

By C. V. Akin, M.D.,**
Mobile, Ala.

After more than 18 years of continuous duty with the U. S. Public Health Service, I have reached the conclusion that whatever of picturesqueness and romance there may be in public health work is to be found in maritime quarantine procedure. The realization that measures of quarantine have been in operation between some of the world trading centers for hundreds of years lends distinction and interest to efforts which might otherwise seem unduly routinized, and contact with ships from all parts of the earth adds zest to the working routine of the quarantine officer. He is kept very much on his toes by the thought of what might happen to the port he serves if, through carelessness, he should permit a condition demanding quarantine treatment to pass unchallenged through his station. To be constantly on the lookout for the unexpected to happen may be a bit straining at times, but in any event this tension keeps the quarantine officer thoroughly alive to what is going on around him. Nowhere is this more literally true than in the Gulf Coast area, where travel between tropical port and quarantine station requires less time than for certain of the most dangerous diseases to incubate.

Until very recently it has been necessary for the quarantine officer at a Gulf station to take what satisfaction he could from the knowledge that his service was of value and to derive as much pleasure as possible from his work wholly without public acclaim. In most instances his station was placed as far away as could be from the port he served so that the people living in the port could not be exposed to presumably dangerous contact with the quarantine station itself. He was in no sense a popular public servant, for it fell to his lot to enforce regulations which more often than not were considered by the public to be harsh and arbitrary.

In the light of our newer knowledge of the cause and of the manner of the spread of dangerous communicable diseases, it is apparent that some of the quarantine measures applied in the past were doubtless the cause of hardship to the shipping interests and to those who traveled about the world in ships, but now on looking back I believe that we must all agree that the ends have justified the means. It should be necessary only to contrast the present state of continuous well being enjoyed by most of our ports with those annual visitations of terror and death which stalked with yellow fever through the Southland only a few decades ago. Only hard and conscientious work, intelligent cooperation for the common good and the expenditure of a great deal of money by the states and Federal Government can account for this remarkable improvement in conditions, so again I say that to the extent to which they hastened the coming of the present state of affairs the most rigorous and seemingly cold-blooded restrictions were worth while.

As the passing years have brought greater freedom from the threat of disease invasion, the active interest of the public in quarantine procedure has faded, but there has been no let-up in the officially conducted campaign to keep out diseases of foreign origin. To the con-

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trary, your Government has continued painstakingly and persistently to perfect its defenses against the importation of disease, and each year has witnessed a significant improvement in the system of health protection erected at the portals of entry. In the course of these progressive improvements, certain protective measures of unestablished merit have been discarded and the rigorousness of others has been lightened as increasing scientific knowledge has pointed out the way to more certain control, but you may be sure that the disappearance of pestilential disease from our ports has occasioned no careless disregard of the dangerous potentialities associated with the periodic flare-up of these diseases in other countries. Our Government may be more strict than some in certain particulars and, in consequence, may be criticised from time to time for too great inflexibility in the enforcement of quarantine measures, but our continued freedom from the ravages of imported diseases and from the economic losses associated with the threat of disease pay dividends which more than offset the comparatively small annual cost of our national quarantine system in money and in public inconvenience.

You would, I am sure, be interested to hear the story of maritime quarantine in the Gulf area in the good old days of 30 or more years ago, and indeed its history is filled with records of great accomplishment and of unselfish sacrifice and service. However, the time at our disposal will permit not even a brief reference to what the various states and municipalities did by way of protecting themselves against the importation of disease from foreign countries, so I shall confine myself to the functioning of the national quarantine system as operated by the U. S. Public Health Service.

An act of Congress, approved February 15, 1893, recognized the quarantine activities of the several states and directed the Supervising Surgeon General of the Marine Hospital to cooperate with all state and municipal boards of health in the enforcement of local rules and regulations of such boards, but provided also for the enforcement of rules and regulations of the United States Treasury Department to prevent the introduction of disease. In addition, and of the utmost significance to quarantine work in the future, this act provided for the purchase by the United States of such state and municipally owned quarantine stations as might be surrendered to the Government for quarantine purposes.

Other acts of Congress passed in 1901 and 1906 provided for designated Federal quarantine areas and anchorages; for penalties for violation of national quarantine laws and regulations and for failure of vessels to secure consular bills of health; granted additional quarantine power and authority to officers of the United States assigned to quarantine duty and specifically authorized new quarantine stations in the Gulf area where necessary to prevent the introduction of yellow fever.

Immediately following the passage of the organic quarantine act of Congress of February 15, 1893, which asserted the policy that the enforcement of quarantine was a function of the Federal authorities the Treasury Department, through the Marine Hospital Service, proceeded to acquire those state and municipally owned quarantine stations which appeared to be essential to the effective operation of a national quarantine system. Between the passage of the enabling act and the year 1921 more than 60 quarantine stations were acquired by purchase, by transfer with no property rights involved, or by new construction. The New York Quarantine Station, the last to be taken over in 1921, completed the Federal chain of protection against the importation of diseases from foreign ports. Out of the list of stations comprising the national quarantine system 20 stations were located in the Gulf area between Key West, Florida, and Corpus Christi, Texas. The realignment of quarantine activities in the Gulf area during the past 10 or 12 years leaves today 18 active stations which stand as the first line of defense of the Southern ports against the quarantinable and pestilential diseases.

The national system of maritime quarantine has been built up slowly and laboriously, but year after year there have been advances and improvements which make its defenses more effective. From time to time the quarantine regulations have been revised and amended in keeping with advances in scientific knowledge. Material changes have been made in the provisions relating to measures directed toward preventing the introduction of plague, cholera, yellow fever and typhus. Time has witnessed the laying of great stress on the importance of bacteriological procedure in the regulations relating to cholera, in preference to reliance on clinical symptoms or the employment of an arbitrary period as the stage of incubation. In the regulations on plague, the requirements are chiefly directed against the rat and rat fleas, while man as the

transmitter is considered to be of negligible importance. More effective fumigants are used and the rat-proof construction of ocean-going vessels is coming more and more to the fore as the factor of chief importance in controlling the spread of plague through rats on shipboard. Through the cooperation of foreign governments and through measures applied by ships' medical staffs to passengers and crews en route, cases requiring quarantine treatment on arrival at United States ports of entry have been steadily reduced. There are many quarantine stations of the Service which never see a case of quarantinable disease among arriving passengers or crew from one year to another. Out of 2,200,000 passengers and members of crews on approximately 18,300 vessels inspected at continental and insular quarantine stations during the year ended June 30, 1931, only 497 persons on 13 vessels were detained on account of quarantinable diseases. Only the most effective control of disease at the foreign ports of debarkation plus the careful elimination of persons potentially infected with a quarantinable disease could account for this favorable state of affairs.

To a far greater extent than any other section of the United States, the Gulf Coast is exposed to the importation of dangerous communicable diseases of tropical and subtropical origin. The factors of danger are the proximity of foreign foci of disease, the rapidity of communication between these foci and Gulf ports and the high degree of infectibility of our Southern ports to certain pestilential diseases such as yellow fever and plague. The rapid development of air travel has injected a new element into the maritime quarantine picture. With the exception of cholera which has its focus of endemicity in India most of the quarantinable diseases may be brought to the United States by airplane well within the incubation stage of the disease and before any symptoms can be observed in the infected traveler. This is particularly true of yellow fever, which is potentially present if not actually so in certain sections of South America with which we are in direct contact through regularly established airplane lines. By 1930, the Public Health Service had established quarantine and medical immigration inspection units at 23 airports of entry and a continuous effort is being made to improve and to make this new departure in quarantine activity as effective as the inspection of ocean-going vessels has been.

One phase of the quarantine problem incident to rapid airplane travel which is giving the Service much concern has to do with the introduction of new species of insect vectors of disease which heretofore have not propagated in the United States, but which may be brought in from remote countries and find suitable living conditions in the Southern states. Surgeon L. L. Williams, Jr., who has charge of the Malaria Investigations of the Service, states that an African species of anopheles mosquito, a much more active carrier of malaria than our own *Anopheles quadrimaculatus*, and capable of breeding in all sorts of fresh water, including temporary rainwater pools, has been found in two separate places on the northern coast of Brazil since airplanes have flown from north Africa to Brazil. Dr. Williams feels that the introduction of this mosquito into the United States would enormously complicate the control of malaria and would perhaps represent a greater hazard than the convection of yellow fever by the airplane.

From the viewpoint of the quarantine officer stationed in the Gulf area, yellow fever and bubonic plague are as yet the two quarantinable diseases which represent his greatest responsibility. The same is equally true for the quarantine officer on both Atlantic and Pacific coasts whose station lies within the zone of infectibility of these two diseases. We keep our eyes open to the possibility of other quarantinable diseases slipping in, but all of us would sleep better at night if we had neither yellow fever nor plague to think about. Both of these diseases have chalked up a score in a number of United States ports and as the high degree of infectibility of our Gulf ports is definitely established, it behooves no responsible health official to take the position that it cannot happen again. We may perpetuate our present freedom only at the expense of vigilance at the foreign port, painstaking care in inspection and treatment of suspected cases by quarantine officers at the port of entry and through the continuous operation of effective health measures on the part of local health authorities in these ports. It would be altogether faulty to consider the maritime quarantine service as an absolute bar to the admission of cases of quarantinable diseases. At best it is a screen through which must pass all who

would enter a United States port and it should be effective to the point of holding back all obviously infected persons in the active state of disease and, because of its easily aroused suspicions, to detain for further inspection and study all persons who might reasonably be suspected of conveying infection. The final defense of the national health rests with local health departments which will prevent the uncontrolled spread of disease from a case which might inadvertently pass through the maritime quarantine screen.

During the closed quarantine season, which runs from April 1 to November 1 each year, every person, whether passenger or member of crew, arriving at a port on the Atlantic Coast south of Maryland and on the Gulf Coast is carefully inspected for symptoms of yellow fever if the vessel on which he arrives is from a known or suspected yellow fever port. The quarantine officer's authority for considering a given tropical port as actually or potentially infected is the list which comes to him each week from the Bureau of the U. S. Public Health Service. This list is kept up to date through a system of reciprocal information based on international sanitary agreements, one of the most important of which is the Pan American Sanitary Code, adopted at Havana in 1924. Another of world-wide importance is a development of the Sanitary Convention of Paris, adopted in 1903 and ratified by the United States Government in 1905. The latest revision of this international sanitary agreement for the reciprocal notification of diseases was in 1926. Every vessel entering a United States port from a foreign port known or suspected to have had human or rodent plague within a specified time is treated for the destruction of rats and fleas before being given a clean bill of health. Vessels from plague-free foreign ports are regularly inspected to determine whether or not they harbor rats on board and are fumigated for the destruction of these vectors of plague as required.

Dr. E. C. Faust, of the Department of Tropical Medicine of Tulane University Medical School, generously assisted me in preparing a list of diseases of tropical origin which, in addition to the designated quarantinable diseases, actually or potentially menace the health of Southern ports. These diseases were selected because of their prevalence in near-by tropical ports with which Gulf ports have regular trade intercouse and because of the potential infectibility of our ports. Very briefly, the diseases which, in Dr. Faust's opinion, are worthy of serious consideration are:

(1) Heterologous strains of malaria, the danger being from the introduction of new strains for which our population has no tolerance.

(2) Amebiasis (including dysenterics, chronics and carriers). The danger is through food handlers on ships who disseminate amebae, but have only mild symptoms or none at all. Dr. Faust's studies show that while from 15 to 20 per cent of a large population group showed ameba in stools, not more than half of the positives manifested frank symptoms.

(3) Filarial infections, including *F. bancrofti* from Porto Rico and Jamaica. The record of the City of Charleston, South Carolina, demonstrates the possibility of infectibility of a Southern port, and O'Connor's studies in Harlem showed a high rate of infection among Porto Ricans living there.

(4) Fluke infections, principally *Schistosomum mansoni*. Dr. Henry E. Meleney was good enough to write me fully giving his views regarding the potential importance of trematode infections. He suggests that it would probably be possible for the *Schistosomum mansoni* to become endemic in the southern United States because of the presence of many species of Planorbis, the snail which acts as the intermediate host. Dr. Meleney is of the opinion that there is a greater likelihood of the importation of the Schistosomes than of either the Clonorchis or Fasciolopsis, both endemic in China. The Quarantine Division has recognized a danger in these trematodes, while so far no direct action has been taken to prevent the importation of Schistosoma.

(5) Psittacosis, a disease of birds of the parrot family transmissible to man. The menace of this disease has been recognized through executive order of the President and through amendment to the quarantine regulations. Existing restrictions in all probability will prove adequate to prevent the importation and to control the further spread of the disease from already implanted foci.

In closing this painfully inadequate presentation of a most important subject, I beg permission to repeat to the extent of stressing one or two points. The Gulf ports of the United States at this time enjoy freedom from certain pestilential diseases of tropical origin which at one time or another found ready foothold in the United States with disastrous results. Merely because yellow fever seems to have receded from some of the tropical areas which fostered it we may not logically conclude that this scourge has passed forever from its endemic foci. Thanks to the increasing rapidity of transportation, our Southern ports are closer than ever before to the tropics and they are in consequence more than ever before gravely menaced by whatever dangerous infectious disease may

assume epidemic proportions in a near-by tropical country. With countless millions of *Aedes egypti* mosquitoes all along the Gulf Coast and a human population with practically no immunes among it, yellow fever can be reimplanted in the Gulf areas and might possibly gain a foothold if every line of defense was not kept at the highest pitch of efficiency.

In 1931, plague was everywhere as prevalent throughout the world as it had been in recent years. None will deny that the ports of the Gulf Coast have at least their share of rats and if we assume for the sake of argument that each of these rats harbors its quota of fleas we assert the infectibility of these ports to bubonic plague. Air-tight quarantine precautions plus persistent rat killing on the part of residents of these ports will go a long way toward minimizing the danger of a return of plague to the Gulf Coast.

Remoteness from the endemic foci of cholera serves as a constant automatic safeguard against importation of the disease, but effective community sanitation embracing safe municipal supplies of water and food will prevent the spread of the disease, if introduced, which is more important.

We men of the national quarantine system who serve your ports feel that within the limits of our ability and of our equipment we give to the Gulf Coast as high a degree of protection against the importation of disease as is enjoyed by any other section of the United States, but in our work we count heavily on the port communities to make our efforts completely effective by maintaining the even more important second line of defense, which is the local health department.

DISCUSSION (*Abstract*)

Dr. Ernest Carroll Faust, New Orleans, La.—This subject is important to the welfare of the South and particularly the Southern ports. Persons who enter the United States from Mexico, Central and South America should be examined for filarial infections (including *Filaria bancrofti* and Onchocerca); those entering from Porto Rico, the Antilles and northern South America for Manson's blood-fluke infection; and those entering from Panama and northern South America for Chagas' disease (*Trypanosoma cruzi* infection). There is also the danger of introducing heterologous strains of malaria, relapsing fever and typhus into areas with populations non-immune to these diseases. Careful clinical and laboratory examination should be made of all suspected cases or vectors of these diseases at all ports of entry into the United States.

PATHOLOGY OF THE EYE: PREPARING AN EYE FOR MICROSCOPICAL EXAMINATION*

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ESSENTIALS IN HISTOPATHOLOGICAL TECHNIC

(1) Good fixation is to be had only if the cells are still living when the specimen is plunged into the fixing solution.

(2) Gradual hardening in alcohol, 35, 50, 70, 80, 90, 95 per cent, and finally in absolute alcohol, is necessary. When this is properly done it produces perfect dehydration.

(3) Good infiltration is obtained with (a) celloidin and (b) paraffin.

Fixation.—In general it can be stated that there is no absolutely ideal fixing solution. Unquestionably, the best known fixing fluid is 10 per cent formol solution, made by adding 10 c. c. of formol to 90 c. c. of normal saline solution. This has the advantage of being easily made and procured. It penetrates the tissue promptly and sections fixed in formol stain brilliantly with most stains, the cornea remains clear, but shrinks somewhat and the sclera and lens become too hard if the specimen is left in the solution too long. The elements of the retina are well preserved, but most important of all the choroid shrinks excessively. I abandoned the use of formol for fixing the eyeball a good many years ago, reserving it only for the fixing of small pieces of tissue, such as tumors. Whole eyes are allowed to remain in 10 per cent formol for from 12 to 20 hours. If they are left longer the lens and sclera become too hard and make the cutting of thin sections with the microtome difficult. It is not absolutely necessary to wash the eye with running water after fixation, but is advisable, as sometimes black precipitates are formed in the tissue.

Zenker's Solution (Birsch-Hirschfeld's Modification).—For some years I used this solution with excellent results. It is made as follows:

Corrosive sublimate 3.0 gm.
Potassium bichromate 2.5 gm.
Sodium sulphate 1.0 gm.
Distilled water 100 c. c.
Just before using add glacial acetic acid 3.0 gm. and formol (40 per cent) 0.5 c. c.
Fix for 24 hours.

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This is an excellent fixing solution, preserving the retinal elements especially well. It has the disadvantage that eyes fixed in it must be treated with iodine solution in order to remove the precipitated mercuric oxide which in varying degrees forms in the tissues. I recommend that the treatment with iodine solution be postponed until the sections have been made, as it is more certain in its effect upon the thin sections. Either 1 per cent alcoholic solution of iodine or Lugol's solution should be used. Then the sections are immersed in a solution of 0.25 per cent hyposulphite of soda. By having 2.5 per cent stock solution on hand the weaker solution can be made by diluting the stock solution 10 times.

Sections from eyes fixed in Zenker's fluid and later treated with iodine solution stain somewhat slowly with hematoxylin solution, but beautifully in spite of that fact. The cornea is not so well stained as after either formol or Orth's fluid, modified as follows, by combining Mueller's fluid and formol:

Mueller's fluid is made by taking 2.5 gm. of potassium bichromate, 1.0 gm. sodium sulphate, and 100 c. c. of distilled water. The original Orth's fluid was made by adding 10 c. c. of formol to 100 c. c. of Mueller's fluid, but it is better to make the fixing fluid for eyes as follows:

Mueller's fluid	80 c. c.
Formol	20 c. c.

Whole eyes remain in the solution 2 to 3 days. After 4 days a crystalline precipitate spoils it. I have used this modified Orth's solution for the past 6 or 8 years and can recommend it as highly satisfactory. You will recall that Mueller's fluid causes a certain amount of swelling of the tissues and this is largely overcome by the shrinking effect of the formol. The retina is well preserved. The choroid retains its normal thickness and the corneal tissue stains brilliantly, as do other parts of the eye.

We are now ready to prepare for preserving the eye which is about to be enucleated. Since the choice of fixing fluid is left to me this time, we will imagine that the druggist has sent us 100 c. c. of this modified Mueller formol solution, and if you have not a small jar such as I show you here, you may also have the druggist send you a wide-mouthed bottle which should have a mouth at least 1¼ inches in diameter, preferably a little wider. Also the bottle should have a capacity of from 75 to 100 c. c. (3-4 ozs.), as it is important that an excess of fixing fluid be used. Before pouring the fixing fluid into the wide-mouthed bottle or jar it is advisable to put about ½ inch of absorbent cotton on the bottom so that the eye can rest upon it. Also a clean label should be pasted on the bottle or jar. On the label should be marked the kind of fixing fluid, the name of the patient and the date and hour when the eye is placed in it. This bottle, then ready for use, is carried to the hospital in our instrument bag, and when the instruments are gotten out the bottle is placed upon a convenient table in the operating room. When the eye has been enucleated it should immediately be dropped into the fixing fluid, without washing it and without delay. It should not lie out upon the instrument table until the hemorrhage has been controlled and the bandage applied. The reason for this is that the eye should be plunged into the fixing fluid while the cells are still alive, thus insuring correct fixation before the actual death of the cells. When the operation is completed or you have returned to the office, it is well to make a small puncture 3 or 4 mm. long with a Graefe knife through the sclera in the superior quadrant about 5 mm. behind the sclero-corneal margin, and tangential to it, the opening of course going through the retina. This maneuver is not absolutely necessary, but is advisable.

The length of time the eye remains in the fixing fluid depends upon the kind of fluid used. In the case of Mueller-formol, it should be from 2 to 3 days. In 10 per cent formol solution it should be 12 to 20 hours, and in Zenker's fluid, 24 hours. It is best to place the bottle containing Mueller-formal in a semi-dark place.

Washing the Eye.—When the eye is removed from the fixing fluid it should be placed in a large jar or beaker and washed in running water for 24 hours. This can easily be done by attaching a small rubber tube to the faucet and letting the other end be placed in the jar. The water need not run fast; it is sufficient if a slow stream is used.

Alcohol.—The purpose of the alcohol is to withdraw the water from the tissues and at the same time gradually to harden the specimen in order to make it of the proper consistency for cutting sections. The treatment by alcohol must be very gradual, and in order to accomplish this the eye is placed in alcohol of the following strengths: 35, 50, 70, 80, 90 and 95 per cent, remaining in each strength of alcohol for 24 hours. The quantity of these diluted alcohols should be liberal, from 50 to 75 c. c., and wide-mouthed bottles with glass stoppers are necessary. After finally passing through 95 per cent alcohol, the eye must be placed in absolute alco-

hol, and absolute alcohol must be prepared and kept free from water by special means: calcined copper sulphate is used for making absolute alcohol from 95 per cent alcohol. In order to drive off the water of crystallization from copper sulphate it must be heated in a pan on the stove. I usually take about 2 pounds of pulverized copper sulphate and add to it a small quantity of calcium carbonate, the latter being for the purpose of neutralizing the small quantity of free sulphuric acid that is produced when the copper sulphate again takes up its water of crystallization from the alcohol. The copper sulphate as it is heated finally turns almost white and I find that about an hour is required to dehydrate two pounds. After it has been heated for 15 or 20 minutes it is well to stir it occasionally, as that hastens the driving off of the water. As soon as it has become a fine light gray powder it is poured into a jar with a tightly fitted top and kept air-tight. In dehydrating alcohol you can shake up a quantity of the calcined copper sulphate with 200 or 300 c. c. of 95 per cent alcohol, let it settle, filter and do this three or four times until the copper sulphate does not turn blue. This is a little wasteful, as you cannot recover all the alcohol this way. I like better putting the calcined copper sulphate into a small muslin bag whose open end is then tied with a string, and by changing the bag a number of times absolute alcohol is finally obtained with very little loss. Of course it must be filtered before using it. The copper sulphate which has turned blue should be saved until a quantity has accumulated, when it can again be heated and so used over and over again.

We are now ready to place our eye in absolute alcohol, but before doing it we have poured about an inch of the calcined copper sulphate into a glass-stoppered bottle and shaken up about 60 c. c. of absolute alcohol with it and allowed it to settle. It is well to cut a small round piece of filter paper and let it settle down upon the copper sulphate and then place the specimen upon the filter paper. Let it remain for 24 hours. You are now ready to cut the eye. This is a matter of considerable importance. For routine work when one is expecting to make sections through the whole eye the most satisfactory method is to cut a "calotte" or cap from the upper and lower portions of the eye, letting the horizontal plane of the calotte pass through the upper and lower ends of the vertical meridian of the cornea, and thus leaving a generous piece of the eye, containing the optic nerve and papilla, the macula and the pupil in its entirety. If the eye is simply bisected, cutting through the center of the pulpit, it is most likely that when the eye is cut with the microtome a number of valuable sections will be lost before the microtome is working smoothly. In cutting the eye either a thin knife or a thin razor is very useful and they must be very sharp. When cutting it is well to place the eye upon a folded piece of filter paper, or else upon a piece of soap upon which a piece of filter paper has been laid and cut down upon that. It must be done carefully so not to waste parts of the specimen. If the eye contains a tumor it is well to transilluminate before cutting it and then divide the eye in such a way that sections will show the relation of the base of the tumor to the tissue it springs from.

While cutting the eye it is necessary to have it out in the air and to touch it, so it must again be placed in absolute alcohol for a few hours.

The eye is now placed in a mixture of equal parts of absolute alcohol and ether, and this ether must be freed from water by the use of calcined copper sulphate. The glass-stoppered bottle containing about 60 c. c. alcohol-ether mixture, equal parts, must also have calcined copper sulphate in the bottom of the bottle and the specimen must remain in this mixture for from a week to 10 days.

I keep both the bottle containing absolute alcohol and the one containing alcohol-ether mixture in jars which can be hermetically sealed, and have a small quantity of calcined copper sulphate in the bottom of them. The eye should be absolutely free from water before infiltration is attempted.

Infiltration with Celloidin.—During the War when celloidin could not be imported, an American company began to manufacture "parlodion" as a substitute for it. In appearance it is identical and I suspect that its chemical composition is the same. I have used it since the War with the same satisfaction as celloidin and whenever the word "celloidin" is used in this discussion "parlodion" is the substance referred to. It comes in the form of thin, transparent, short strips submerged in water. In preparing a solution these strips, after being wiped with a clean cloth, must be dried thoroughly, preferably in a drying oven or the paraffin oven at a moderate temperature of about 45 to 50° C. A 4 per cent solution known as "thin" and an 8 per cent solution known as "thick" are then made in a mixture of absolute alcohol and water-

free ether. These solutions are made in small jars with tightly fitted covers and it was discovered by Elschnig that celloidin dissolves more quickly when the proper quantity of absolute alcohol alone is first poured over the dried celloidin. This causes the strips of celloidin to swell and an equal quantity of water-free ether can then be added 6 to 12 hours later. If the jar is then shaken from side to side occasionally, the celloidin goes into solution fairly quickly. These small jars containing the celloidin are best kept in larger jars which can be hermetically sealed. On the bottom of these jars a small quantity of calcined copper sulphate is placed and over this a small quantity of absolute alcohol. This keeps all moisture out of the celloidin solution, making it possible to keep the solution clear and free from moisture. The specimen is placed in the thin solution for from 8 to 14 days, preferably 14, for it must be remembered that most of the infiltration takes place in the thin (4 per cent) solution. It is then transferred to the thick solution, where it should remain at least 8 days, and can remain until you are ready to proceed further with it. It does not pay to hurry the infiltration, for thorough infiltration insures good sections.

Embedding.—A small quantity of the thick celloidin solution is poured onto the bottom of a small glass dish about 6 cm. (2¼ inches) in diameter or into a shallow tin box about 2¼ inches square. Thick celloidin solution is then poured over and around the specimen until the container is full. The solution should cover the specimen by several millimeters at least. As a rule, some air bubbles form around the specimen and I have found it good practice to place the glass dish or box containing the specimen in an hermetically sealed jar with calcined copper sulphate and ether on the bottom of it, the glass dish or box resting upon 2 fibre blocks. I leave it there from 2 to 6 hours, until all air bubbles have come to the surface and disappeared. Air bubbles can very seriously interfere with good section cutting if they have been left in contact with the wall of the eye. The dish containing the specimen is then transferred to a clean jar the lid of which is held slightly open by match or toothpick, the object being to permit the celloidin to thicken by evaporation until it is almost as thick as jelly or gelatin. This evaporation should be slow, for if it is too rapid, air bubbles will form and the specimen must then go back into the ether vapor jar until again the parlodion is free from them. The time required for evaporation depends upon the temperature and condition of the atmosphere, so it is impossible to say just how long is required, but in general it can be said to be a matter of some hours, and I have found that in summer at least it is not safe to do it overnight; it should be done at a time when you can watch it and occasionally touch it lightly with a glass rod to ascertain its consistency. When it has reached the required consistency the dish or box is transferred to a large jar with calcined copper sulphate on the bottom, over which from 30 to 50 c. c. of water-free chloroform are poured. The jar is then tightly closed and gradually the celloidin turns cloudy, or milky, showing that the vapor from the chloroform has penetrated. As the penetration goes on the celloidin hardens. Several days' exposure to the chloroform vapor is not too long; in fact, the specimen can remain there for weeks without harm. It is well, however, after about a day's exposure to the chloroform vapor, to cut out a block containing the specimen, leaving an ample margin of celloidin all around the eye, and turn it out of the dish or box, to make sure that the block is uniformly hardened throughout.

We are now ready to decide whether we shall use the "wet" celloidin method or the "dry" method. If the "wet" method is used the block of celloidin containing the eye is put into 70 or 80 per cent alcohol after fastening it to a fibre block with thick celloidin and from then on it must be kept moist with 70 or 80 per cent alcohol, even when cutting sections.

The method I wish to bring especially to your attention is known as the "dry celloidin method", which has many advantages. It was the method used extensively by the late Dr. Feingold, and as he thought it not inadvisable to bring it twice to the attention of the Ophthalmic Section of the American Medical Association, I feel I may be rendering a service by speaking of it before this scientific body.

The dry celloidin method was first mentioned in ophthalmic literature by Dr. Wolfrum in the *Klinische Monatsblaetter* of 1905, volume 2. Its advantages are that the sections are cut dry with the microtome knife perfectly straight, not slanting. The disagreeable feature of having to keep the block wet with 70 to 80 per cent alcohol is eliminated and sections throughout the whole eye can generally be cut thinner than by the "wet" method. The method deserves to be better known, as its advantages are great. I have used it exclusively for more than 15 years with increasing satisfaction. So let us finish our block by the "dry" method.

It goes first into a large-mouthed bottle which contains equal parts of water-free chloroform and cedar oil. The mouth of the bottle is left open and the bottle placed on the top of the paraffin oven, which is slightly warm, and gradually the chloroform evaporates. In the meanwhile the block containing the eye has become perfectly transparent and turned an amber color. As the chloroform evaporates care must be taken to see that the block is not uncovered. If necessary add some cedar oil, as shrinking could occur if the block got dry for many hours. When the chloroform has evaporated, or at about the end of a week, the block can be placed in pure cedar oil for several days. The specimen is now ready to be mounted upon a fibre block by drying the sides and the bottom of the block and rubbing them gently with a mixture of absolute alcohol and ether. Also clean the surface of the fibre block in the same manner and then place some thick celloidin upon the fibre block which should have a few shallow grooves cut into its upper surface with a saw in order to help the block to stick, and simply lay the celloidin block upon the thick celloidin without pressing it, until the celloidin has dried. If we wish to keep this block, before cutting our sections it is necessary to place it in a jar on the bottom of which a few drops of cedar oil have been poured and see that the lid of the jar fits tightly. When we are ready to make sections it is well to time matters so that we take the block out of its jar six hours in advance and let it dry in the air, after having wiped it off with a clean cloth. This improves the cutting qualities greatly.

Cutting Sections.—We fasten our block securely in the holder on the microtome and, adjusting the knife at right angles to the block, fasten it securely in its clamps. The knives for the dry celloidin method must have a thick back. Mine are 13 mm. thick at the back and are only slightly concave on both sides. We adjust the block so that the celloidin almost touches the under side of the edge of the knife. Set the feeding apparatus to make thick sections and make a few until we are smoothly cutting through the whole specimen. We now set the feeding apparatus so as to make sections of the desired thickness, remembering that it is better to have the sections one micron too thick than too thin, for if they are too thin they are apt to be incomplete or torn. We now select a new part of the edge of the knife and again make certain that it is very tightly secured. Each section as made is lifted from the knife with a small camel's hair brush and immediately dropped into 95 per cent alcohol (denatured alcohol will do) where the sections unroll and the cedar oil is extracted by the alcohol. If only a small quantity of alcohol is used it is advisable to transfer the sections to a second dish in order to get rid of all the cedar oil. If a generous quantity is placed in the dish at first, it is not necessary to change the alcohol.

Staining and Mounting.—As soon as the cedar oil has been removed from the sections, transfer them one at a time by means of a broad section lifter to a large dish of clear tap water, where they flatten out completely. I usually leave the sections in the 95 per cent alcohol until we are ready to stain and mount them. It is best not to attempt handling too many at one time. From the tap water the section is lifted into a dish of distilled water and then is ready for staining in hematoxylin. The solution I now use is made as follows:

Hematoxylin 1 gram is dissolved in one liter of distilled water. When the hematoxylin has dissolved add 0.2 gram of sodium iodate and 50 grams of ammonium alum. The solution immediately turns a beautiful dark purple color and is ready for immediate use. This is known as Mayer's hemalum and is extremely satisfactory. Every six months a new quantity must be prepared, as it loses its staining qualities in about that time. The addition of 2 per cent acetic acid makes it more precise in staining the nuclei, but I prefer to work with the solution as given above. Owing to the depth of the color of hematoxylin solution, I find it advisable in staining sections not to place the section in the stain with a section lifter, but while the section is in the distilled water I place a glass dish under it that is perforated with small holes. I then transfer it still in this perforated glass dish into the hemalum and when the staining is completed lift it out, still in the perforated glass dish, and place it in a dish of distilled water from which it is easily turned out. This avoids fishing in the dark-colored hemalum solution with a section lifter and possibly tearing the specimen. Until I adopted this method I destroyed quite a few sections. The length of time required for staining in the hemalum solution varies from 3 to 15 minutes and is best determined by trial. Most hematoxylin solutions stain more rapidly as they become older. Having determined the time required for a section of a given eye, it is very easy to stain a large number of sections quite uniformly. All hematoxylin solutions must be filtered before using and can, of course, be

poured back into the stock bottle when through staining, provided the stain has not been diluted. Some beautiful staining can be obtained by diluting the hemalum solution greatly, a few drops of the stain to a small glass dish of distilled water, and leaving the section in this diluted solution for from 12 to 24 hours. For routine work, however, this is not at all necessary. Should overstaining occur in using the full strength solution by treating an overstained section with 0.5 to 1 per cent alum solution in distilled water, the excess of stain can be removed. Also a solution of acetic acid, 1 drop to 30 c. c. of water, can be used to remove the excess of stain, after which the specimen should be thoroughly washed in water. The removal of the acid can be hastened by placing the section in a solution containing 1 drop of ammonia to 100 c. c. of water. After washing the section in distilled water it is placed in a dish of ordinary tap water, where in 10 to 15 minutes it turns blue. We now must begin to remove the water from the section, so we first place it in 70 per cent alcohol for 10 minutes and then in 95 per cent alcohol for 5 minutes, and then into 95 per cent alcohol containing a few drops of a concentrated alcoholic solution of eosin, and just how long one leaves it depends largely upon the taste of the person who is doing the work. For general work it is desirable not to stain too deeply with eosin, as it spoils the contrast. For microphotographic work it is best to overstain slightly.

Mounting.—As celloidin and parlodion are soluble in absolute alcohol, we must mount the section from 95 per cent alcohol. I prefer to put the 95 per cent alcohol that contains eosin in a medium-sized flat china dish, and instead of handling the stained section with a section lifter, I place a clean slide under the section and coax it into its final position on the slide with a glass rod. I find I avoid tearing and wrinkling the section in this way. The 70 per cent, as well as the 95 per cent alcohol, should be filtered before using, and I usually keep a stock bottle containing the 95 per cent alcohol, which is tinged with eosin. This can, of course, be used many times, provided it is always filtered before using. The section is blotted with a piece of filter paper folded several times and cleared with carbo-xylol made by dissolving 15 grams of carbolic acid crystals in 45 c. c. of xylol which is poured over the section and allowed to remain there from 5 to 10 minutes. The carbo-xylol is then washed off with pure xylol, the specimen is blotted with folded filter paper and several drops of a neutral solution of Canada balsam in xylol are placed upon it. A clean cover glass is then gently placed upon the section by means of cover glass forceps. If one is careful the section can be examined immediately with the microscope, but it is considerably clearer some hours after the cover glass has been applied.

BIBLIOGRAPHY

1. Greeff, R.: Anleitung zur mikroskopischen Untersuchung des Auges, 3rd Ed. August Hirschwald, Berlin, 1910.
2. Seligmann, S.: Die mikroskopischen Untersuchung methoden des Auges, 2nd Ed. S. Karger, Berlin, 1911.
3. Monthus, A. et Opin: Precis de Technique Microscopique de L'Oeil, 2nd Ed. Asselin et Houzeau, Paris, 1910.
4. Mallory, Frank Burr; and Wright, James Homer: Pathological Technique, 6th Ed. W. B. Saunders Co., Philadelphia, 1915.
5. Lee, Arthur Bolles: The Microtomist's Vade-Mecum, 7th Ed. P. Blakiston's Sons & Co., Philadelphia, 1913.
6. Ginsberg, Siegmund: Grundriss der pathologischen Histologie des Auges. S. Karger, Berlin, 1903.
7. Greeff, Richard: Die Pathologische Anatomie des Auges. August Hirschwald, Berlin, 1902-1906.
8. Salzmann, Maximilian: Anatomie und Histologie des menschlichen Augapfels. Franz Deuticke, Liepsig und Wien., 1912.
9. Parsons, J. Herbert: The Pathology of the Eye, 4 vols. G. P. Putnam's Sons, New York, 1904-1908.
10. Friedenwald, Jonas S.: The Pathology of the Eye. Macmillan Co., New York, 1929.
11. Adams, P. H.: Pathology of the Eye. Henry Frowde: Oxford University Press; Hodder & Stoughton, London, 1912.
12. Collins, E. Treacher; and Mayou, M. Stephen: Pathology and Bacteriology of the Eye. P. Blakiston's Sons & Co., Philadelphia, 1911.

NON-DIPHTHERITIC LARYNGOTRACHEOBRONCHITIS*

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and
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While this condition is rare, it is seen more often than is generally suspected by the profession. Laryngitis of the infectious type is a common clinical entity. The severe types with dyspnea and obstruction are usually called diphtheria, treated as such and given no further thought. Often a micro-organism other than the diphtheria bacillus is causative.

About 1920, we began to realize that there were non-diphtheritic infections of the trachea, larynx and bronchi in which the onset and symptoms simulated diphtheria, but in which antitoxins gave no relief, and mechanical obstruction below the cannula was decidedly more troublesome than in true diphtheria.

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CASE REPORT

H. L., a male infant, age 14 months, whose normal weight was around 30 pounds, was breast fed and had been delivered normally. There was difficult breathing at the time of birth for 24 hours. On August 21, 1932, around noon he was first seen, at which time he was croupy and a little hoarse. His temperature was 102° F. His throat was red, his tonsils were hypertrophied, and his ear drums were red, but not bulging. The throat culture and smear at the time were negative for diphtheria, but positive for staphylococcus. His blood count showed white cells 33,000, polymorphonuclears 66, small lymphocytes 32, large lymphocytes 1, transitionals 1, and index 4. As night came on he grew progressively worse, with respirations growing more labored and his temperature going to 104° F. When he was seen at midnight a tentative diagnosis of laryngeal diphtheria was made, 15,000 units of antitoxin were given and symptomatic treatment was instituted. Next morning, August 22, there was no improvement. He was given 40,000 units of antitoxin. A culture of his throat at this time showed staphylococci, but no diphtheria bacilli.

No change for the better was noted in the child's condition following the administration of antitoxin. His respiration grew more labored. On Monday night, August 22, a low tracheotomy was performed. No membrane of any significance was found and dyspnea was not relieved, as it is in true diphtheria. His temperature remained high, around 104° F. He was given fluids in large amounts. Glucose was given intravenously and the tracheotomy was kept open as well as possible with suction. Large plugs of mucus were removed in this way. Epinephrine was put directly into the trachea and bronchi with some temporary relief. Culture direct from the trachea and bronchi showed staphylococci in pure strain. The respiration ranged from 60 to 80 per minute at all times.

X-ray at this stage showed an enormous thymus with some infiltration of the right upper lobe of the lung. Around midnight Tuesday he began to be cyanosed for the first time and grew steadily worse, despite supportive measures. He died at about 10 o'clock Wednesday morning, August 24.

Family History.—The mother and father were living and well. He lost a baby brother at the age of 18 months with colitis.

Past History.—Until July 4, he had never been sick in his life. On July 4, he had some temperature which lasted for three or four days and disappeared. Treatment consisted of quinine, milk of magnesia, and so on. After a week the temperature reappeared and continued intermittently until August 21, when the acute attack of laryngitis set in, ranging between 99.5 and 100.5°. It came on around 11 o'clock in the morning and disappeared around 6:00 p. m. The child was put on alkalies, his bowels were kept open, and quinine was given despite negative malarial smears. He seemed to feel well and his appetite remained good at all times. At no time was there any gastro-intestinal upset. There was no loss of weight. Blood counts from August 8-22 were as follows:

August 8, 1932—White blood cells, 21,000; polymorphonuclears, 38; small lymphocytes, 54; large lymphocytes, 4; eosinophils, 3; trans. morph., 1.

August 10, 1932—White blood cells, 20,600; polymorphonuclears, 14; small lymphocytes, 81; large lymphocytes, 3; eosinophils, 1; trans. morph., 1.

August 11, 1932—Red blood cells, 4,120,000; white blood cells, 18,400; polymorphonuclears, 19; small lymphocytes, 74; large lymphocytes, 3; eosinophils, 2; trans. morph., 2; index, 9½.

August 16, 1932—White blood cells, 15,400; polymorphonuclears, 25; small lymphocytes, 69; large lymphocytes, 3; eosinophils, 1; trans. morph., 2; index, 2.

August 22, 1932—White blood cells, 33,200; polymorphonuclears, 66; small lymphocytes, 32; large lymphocytes, 1; eosinophils, 0; trans. morph., 1; index, 4.

On August 1, the baby first had symptoms referable to the upper respiratory tract. At this time he had a red pharynx and pink ear drums. Around August 10 the left ear looked so suspicious that tympanotomy was performed. Nothing but serum was found. Some clinical improvement was noted. About a week after this he developed impetigo contagiosa and was treated accordingly.

This child undoubtedly had a weakened resistance before the onset of the tracheobronchitis. Especial attention should be called to the rather abnormal blood picture which was present for two months previous to the last illness. A marked decrease in polymorphonuclears with a corresponding increase in the lymphocytes is suggestive of a chronic process of some kind.

At this point it might be well to diverge a little to stress the importance of a complete blood picture in all diseases of the ear, nose and throat. Dean, of St. Louis, states that the otolaryngologist sees not only cases of agranulocytosis, but also infectious mononucleosis and more commonly cases of lymphatic reactions following infections about the nose and throat. He also sees cases of myeloblastic leukemia, aplastic anemia, myelogenous leukemia and lymphatic leukemia. The early symptoms of these diseases may manifest themselves first in the throat.

REVIEW OF LITERATURE

The literature on infectious laryngitis is very scant. The information found in the usual reference books leads one to the belief that all severe cases of laryngitis are probably diphtheria and should be treated as such.

Leigh reported 4 cases with three deaths during an epidemic of influenza, the predominating organism being streptococcus.

Seitz reports 2 cases with one death similar to the cases reported by Leigh.

Baum reports a series of 24 cases with findings very similar to our case. Staphylococcus was the offending organism in all but one case. He calls the disease acute laryngotracheobronchitis, which is an anatomically correct term. He points out the seriousness of prolonged delay in performing tracheotomy because of the severe physical strain and the terrific burden thrown on the heart.

Gittens reports a series of cases, 14 in number. His description of the cases is similar to that of Baum's. All reports give a mortality of between 33 and 50 per

cent and the predominating organism is either streptococcus or staphylococcus.

Dr. Chevalier Jackson says that for a number of years he has been observing these cases and the outstanding feature of the disease is the fact that it is not recognized, and is wrongly recorded in the literature.

Beare, writing in the *Medical Journal of Australia*, reports a number of cases with a 33 per cent mortality.

SYMPTOMS

The onset may follow a respiratory infection which first seemed to be of little consequence, or the onset may be sudden without prodromal symptoms. The pharynx may be slightly reddened or it may show no change. The child is suddenly acutely ill, the breathing is labored and becomes progressively more so. There is a marked tracheal tug and the diaphragm seems to jerk with the violent breathing. The pulse is rapid, the expression is anxious and the child seems to be suffocating. At first toxic symptoms are not in evidence, but as the condition progresses the patient shows more signs of toxemia. Physical examination reveals little. The throat is only slightly reddened. The lungs may contain a few rales, but this is not a constant finding. At times the dry, sticky mucus gives the asthmatic wheeze of a foreign body in the lung.

The primary dyspnea is due to a swelling and edema of the larynx and trachea.

The differential diagnosis must be made from persistent thymus, laryngeal diphtheria, bronchial asthma and acute edema of the larynx. Leigh points out, in discussing his cases, that most of these conditions are accompanied by both inspiratory and expiratory dyspnea and toxemia may show late. Roentgen ray examination will rule out enlarged thymus in nearly all cases. Asthma may have the same onset, with nothing to pin the diagnosis on unless there has been a previous attack.

The absence of membrane does not rule out diphtheria, and the fact that both of these conditions progress rapidly makes the differentiation difficult. Direct laryngoscopy with direct smears and cultures make a positive diagnosis. Spasmodic croup usually responds to the relaxing effect of ipecac and inhalation and is generally seen at night.

TREATMENT

Prophylactic treatment in laryngitis always includes general measures to protect the child from any irritating external cause, such as cold winds, dust-laden air and so forth.

Enlarged tonsils and adenoids should be removed. The resistance of the child should be built up by careful feeding, administration of cod liver oil and sun baths. All children should be given toxin-antitoxin mixture for immunization against diphtheria.

Medical measures vary as the symptoms arise. The fluid level of the body should be maintained at all times. The fluid should be forced. The administration of large doses of sodium bicarbonate at frequent intervals has given good results in some cases. Small doses of syrup of ipecac at frequent intervals help the milder cases. Apomorphine, atropine, epinephrin and inhalations are all of value in many instances.

If the diagnosis is doubtful, diphtheria antitoxin should be given. Low tracheotomy is the operation of choice. Although some prefer intubation, we believe that the open tracheotomy tube gives much better access to the trachea for the removal of the thick, sticky mucus encountered in these cases.

SUMMARY

(1) The predominating organisms found are the staphylococcus and streptococcus.

(2) Low tracheotomy with mechanical removal of mucus is essential in severe cases. Fluids should be forced. Antispasmodics are also useful.

(3) This is a very serious disease with a mortality around 50 per cent, and it is often misdiagnosed as diphtheria.

(4) The condition is much more prevalent than was formerly thought. An early diagnosis should be made and energetic treatment instituted.

BIBLIOGRAPHY

1. Cultra, G. M.; and Streit, A. J.: Non-Diphtheritic Infectious Laryngitis. Texas State Journal of Medicine, 26:364-368, Sept., 1930.
2. Beare, Frank: A Series of Cases Resembling Laryngeal Diphtheria. Med. Jour. Australia, 1:668-670, May, 1930.
3. Leigh, Harry: Sudden Death from Acute Laryngeal Obstruction of Non-Diphtheritic Origin: Report of Cases Occurring During a Winter Epidemic and Autopsy Findings. Southwestern Med., 11:210-213, 1927.
4. Seitz, R. P.: Acute Streptococcic Laryngitis in Children. Calif. and West. Med., 30:259-260, 1929.
5. Baum, Harry L.: Acute Laryngotracheobronchitis. J.A.M.A., 91:1097-1102, 1928.
5. Gittins, T. R.: Membranous Laryngitis and Tracheobronchitis (Non-Diphtheritic). Ann. Otol., Rhin. & Laryng., 35:1110-1129, Dec. 26, 1926.

DISCUSSION (*Abstract*)

Dr. Calhoun McDougall, Atlanta, Ga.—Only a physician of Dr. Kirkpatrick's long years of clinical experience and scientific observation can tell us that this disease is not new in recognition, although it has been omitted from the text-books during the past few years. He states that the old text-books refer to it as pseudomembranous croup and catarrhal fever. The older cli-

nicians were much keener observers than we are today, as they did not have the modern laboratory to make their differential diagnosis between diphtheria and pseudo-diphtheria.

I have had three cases of acute non-diphtheritic laryngotracheobronchitis. All of them were in children, developing in the course of an acute respiratory infection. The onset of the respiratory obstruction was sudden and two patients were nearly asphyxiated, as they were seen late. They were relieved by an emergency tracheotomy. The third case, a child two years old, was aspirated by a suction machine through a catheter passed into the trachea at intervals of every two or three hours for two days.

These patients recovered after three days of dyspnea and great toxemia. All were given diphtheria antitoxin immediately.

The main differential points for diagnosis of non-diphtheritic laryngotracheobronchitis are: sudden onset, marked toxemia, hoarseness without loss of the voice, and negative culture for Kleb-Loeffler bacilli when the smear is taken from the bronchial secretions by modern endoscopy. I have noted 18 cases of this disease reported by American laryngologists during the past ten years. Four were treated without cannulization. They appeared to be mild types, while the others were tracheotomized. Most of them were thought to be diphtheria at first and received antitoxin, but the formation of a thick, tenacious secretion continued and toxemia increased. All cultures were negative for diphtheria. Streptococcus and staphylococcus were present with the hemolytic streptococcus predominating.

Early low tracheotomy under local anesthesia, if time permits, is the best treatment. Intubation is unsatisfactory. The use of the suction catheter through the tracheal cannula, early and often, supplemented by instillations of epinephrin or warm liquid petroleum is the most satisfactory way to remove the sticky secretions from the air passages. I have also used 3 per cent solution of papain dropped into the cannula to soften hard sloughs of the membrane. Codein is given children in small doses to keep them comfortable, but I do not use atropine, as it dries the secretions and causes blocking of the passage.

It is sometimes necessary to pass the bronchoscope through the tracheal wound to remove large crusts when obstructing the bronchi. I think it is always well to give diphtheria antitoxin in these cases, as we can never be sure at first that we are not dealing with diphtheria. Also the foreign protein effect of the antitoxin is advantageous in any infection.

Dr. B. D. Sibley, Birmingham, Ala.—In discussing non-diphtheritic laryngotracheal bronchitis, I shall confine my remarks only to its most dreadful feature: the obstruction to the passage of air through the larynx.

Some of our best authorities, especially Dr. Jackson in his latest book, advocate tracheotomy immediately in all cases.

Dr. Jackson's cases are all brought in to him at a hospital, where the atmosphere is kept properly heated and moistened. Tracheotomy is more suitable there than it would be for many of our cases which occur in humble cottages where the ideal surroundings are not to be had. And in consideration, as we know that the principal function of the nose is to prepare the air before the entry to the lungs, it is more desirable to use this function.

Personallly, I prefer to do an intubation whenever possible.

After the epiglottis has been passed we know that the swelling is principally confined to the sides of the larynx. The mucous membrane is tightly adherent to the vocal cords. Frequently, it is easy to insert an O'Dwyer tube between the vocal cords. The swelling to the subglottic area is also confined to the sides and relief to airblock is immediate.

Nor do I wait for diagnosis. I administer a large dose of antitoxin and have never regretted doing so. Frequently the culture is negative, but no harm is done and success is often gained.

Should the intubation fail to give air it is easier to open the trachea with the tube in the larynx as a guide for operation.

I never administer a sedative to relieve cough in these cases, for it makes more difficult the labored breathing. It is dangerous.

No set method of treatment is suitable to all cases.

I saw a case of angioneurotic edema in a bright mulatto woman, a colored banker's wife, prominent in the social circles of her race. She was a typical neuro. I was called for a tracheotomy, found marked pale swelling about the pharynx and upper larynx, but could see a chink between the vocal cords. Intubation was done. Calomel was ordered with saline to follow. The patient coughed out the tube the next morning and felt well. There was no more trouble, the edema was gone, and dyspnea relieved.

In another case there was a metastatic infection. A man 35 who had been operated upon for a carbuncle on his neck some days before returned to the hospital nearly asphyxiated. I was called in a hurry and got there to find him blue from lack of air. A tracheotomy was done and he coughed up a large amount of pure pus through the tracheal opening. He revived quickly. The lower pharynx and upper larynx were very much swollen. This man lived for four days, seemed cheerful and hopeful, wrote messages and was conscious nearly to the last, although he had a staphylococcus septicemia. This was a case of abscess that drained into the trachea, with blood stream infection.

Another patient, a mechanic, who was recovering from typhoid fever, was choked up with a marked dyspnea. He wore a tracheotomy tube until he was strong enough to come to my office, when I passed a silver male urethral sound from below upward through the tracheal opening into the larynx until I could feel it with my finger in the mouth. I passed increasingly larger sounds until I could put in an O'Dwyer tube from above. I worked with this patient for a year and a half and succeeded in giving him a useful but rasping voice.

At the Hillman Hospital this last summer I was called upon to relieve a negro woman of dyspnea after a goiter operation under local anesthesia. She was pulling hard for air, so I inserted a long Mosher curved silver tracheal tube through the mouth into the larynx, which relieved her immediately. Soon I removed the silver tube and inserted the large O'Dwyer tube, which kept her comfortable. I was called later to find that she had coughed the O'Dwyer tube out and had herself reinserted the long silver tracheal tube. I taped the tube in place with adhesive and she wore it for several days. It was finally removed and she had an uneventful recovery.

In another patient whose tongue was swollen and protruding, a tracheotomy relieved the dyspnea. He was taken to St. Vincent's Hospital and several incisions were made in his tongue and pharynx, which was red and swollen. No pus was found, but culture showed a pneumococcus. He died in 36 hours.

There can be no one selected method that will suit all cases of obstruction to the air passage.

In closing, just for a moment permit me to be sentimental, as I sit here considering the fact that a quarter of a century has passed since this organization met in this city, and on that occasion I read a paper which was ably discussed by Dr. Kirkpatrick. It is indeed a source of joy to realize that Fate has dealt such a gentle hand to him.

As I look back through the twilight of the past, it seems of short duration. The years have turned over rapidly, like the leaves of an opened book blown by the swift winds of time. There were but few men present at that first meeting. Among them were three ever dear to us all: the sound of whose voices we shall hear no more. I refer to Dr. Savage of Nashville, Dr. Lynch of New Orleans, and Dr. Stucky of Lexington, Kentucky. Their records stand out prominently like monuments or beacon lights to pilot the way for others to follow and emulate. I am indeed glad to have this opportunity to pay tribute to their memory.

Dr. Homer Dupuy, New Orleans, La.—This type of case must be extremely rare. Unless the culture is taken under the membrane the results will often prove negative. In the presence of such a clinical picture as has been described we must assume that the condition is diphtheria. Give several large doses of antidiphtheritic serum, not less than 20,000 units each. Dr. Kirkpatrick acted wisely. Our experience in the Charity Hospital bears out the belief that such conditions are usually diphtheria. Tracheotomy is often required. I personally do not recall a case of non-diphtheritic laryngotracheal involvement. All such anatomical invasions were diphtheria. The majority of cases were tracheotomized, using the tracheal cannula for the suction apparatus, with the proper size soft rubber attachment for removal of membranes.

Dr. Kirkpatrick (closing).—It has been experimentally demonstrated that even partial obstruction of the trachea or bronchus causes in a very short time atelectasis. These children die, not from pneumonia, as was supposed, but from atelectasis and respiratory failure. Therefore, we must not delay piping air into the lungs after the onset of definite symptoms of dyspnea. The satisfactory response to the administration of oxygen in this case prompts me to urge that such patients be placed in an oxygen tent and kept there until all danger is passed.

Bacteriophage should be tried in these cases. Since this case was treated I have had an opportunity to use it in sinusitis with apparently satisfactory results. There are now preparations on the market that can be used topically, hypodermically and intravenously, and we should give them a careful try out in suitable cases to determine their status in therapy.

I appreciate Dr. Sibley's reference to the coincidence of my discussion of his paper before this Section twenty-five years ago.

BELL'S PALSY AND ITS TREATMENT*

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Bell's palsy or facial nerve peripheral paralysis is the most common of all forms of paralysis; yet its diagnosis is far from a simple matter.

Bell's palsy is due to a motor neuritis and is nearly always unilateral. It occurs in young adults, being rare before twenty and after forty years of age. In our experience females are more frequently affected than males, but the opposite is the case in some clinics. Although peripheral paralysis of the facial nerve may appear as a complication of constitutional disease or as a result of focal infection or be due to nerve injury, fracture of the skull base, or tumor of the face or to extension of bone infection, true Bell's palsy occurs as a rule in healthy individuals with exposure to wind or cold as the inciting cause of the inflammation of the nerve which takes place usually from the stylo-mastoid foramen distally. At times the inflammation may extend for a varying distance up the nerve in the fallopian aqueduct.

The writer[1] considers and has described the intermediate nerve, or the nerve of Wrisberg, as a separate cranial nerve and, hence, believes that the geniculate ganglion and the chorda tympani nerve, which gives taste to the anterior two-thirds of the tongue, are parts of the intermediate nerve rather than of the facial nerve. Thus considered the facial is a motor nerve whose cells arise mainly in the pons with some in the floor of the fourth ventricle. The root of the facial nerve in the pons hooks around the nucleus of the abducens nerve and goes outward to the internal auditory meatus to enter the fallopian aqueduct in the temporal bone. It leaves the aqueduct through the stylo-mastoid foramen to divide into branches which supply the muscles of expression to the side of the face.

Purves-Stewart[2] has given a comprehensive description of the clinical and diagnostic symptoms of Bell's palsy which we shall briefly enumerate. The flat side of the face is the paralyzed side. There is asymmetry of the face at rest which is increased by voluntary movement. On

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the paralyzed side the patient cannot wrinkle the brow. On the paralyzed side the eye cannot be closed. The lower eyelid sags and tears run down the face instead of into the lacrimal duct. On attempt to close the eye the ball on the paralyzed side rolls upward and to the outer or inner side. On attempt to look downward slowly, owing to lack of antagonism of the orbicularis, the upper lid on the paralyzed side may move up a little (Dutemps and Cestan). On attempt to look upward to the full extent the globe on the paralyzed side comes to rest at a higher level than on the normal side (Negro). Conjunctivitis may occur on the paralyzed side due to inability to close the lid. The corneal reflex is absent on the affected side. There is lessening of the labio-nasal fold on the affected side. There is absence of the naso-palpebral reflex on the paralyzed side. (This is elicited by percussing the root of the nose with the eyes closed and the physician touching the outer border of each lid. Movement is not felt on the affected side in Bell's palsy.) This is also a valuable prognostic sign (Gullian). The eyelid which cannot be closed during the waking hours frequently closes during sleep. It is impossible voluntarily to move the ear on the affected side. Reaction of degeneration, partial or total, takes place on the paralyzed side. Sweating is diminished on the affected side. Pressure-pain sensibility is lessened on the paralyzed side.

If the lesion should extend up into or originate in the fallopian aqueduct but be below the geniculate ganglion all the symptoms mentioned may occur and in addition the chorda tympani nerve may be pressed upon and taste may be diminished or absent to the anterior two-thirds of the tongue on the affected side. Saliva may also be interfered with and the tongue be excessively furred on that side. Unless the lesion extends up into the aqueduct taste is not affected. If the inflammation extends to just below the ganglion the nerve to the stapedius may be affected and give hypersensitiveness to loud sounds and voluntary stretching of the orbicularis palpebrarum does not produce the normal subjective sound in the ear on the affected side.

If the facial nerve is affected between the geniculate ganglion and the pons, taste, through the chorda tympani which is an extension of the intermediate nerve not of the facial, is unaffected but the cochlea nerve which lies close is almost invariably interfered with, giving nerve deafness on the affected side. Headache and vomiting may also occur and one must bear in mind acoustic tumor.

Cases of facial paralysis with auricular herpes, tinnitus and at times vertigo constitute one type of Hunt's syndrome.

If the lesion affects the roots of the nerve in the pons, facial paralysis occurs without deafness or affection of taste, however, the abducens is usually affected, giving a swinging of the ball to the inner canthus, because the facial nerve hooks around its nucleus.

If the facial nucleus is affected hearing and taste are not affected. In facial paralysis from a central lesion all of the scattered cells of the facial nucleus are not necessarily affected and the upper branch supplying the forehead frequently escapes.

Bilateral facial paralysis may occur in post-diphtheritic paralysis, polyneuritis, basal meningitis, especially syphilitic, encephalitis and in double otitis media.

One of our cases, a child age five and a half years, had severe nephritis with a hypertension of over 250 systolic. The child had recurrent headaches, facial paralysis of the right side and retinal hemorrhages. The facial paralysis had been diagnosed elsewhere as Bell's palsy. Taste and hearing were not involved but the abducens was slightly affected. We made a diagnosis of central facial paralysis in spite of the fact that all three branches were affected. Later the child developed facial paralysis of the left side also and died with hemiplegia and convulsions. We think undoubtedly this child had small multiple cerebral hemorrhages which caused facial paralysis.

Except in very mild cases, Bell's palsy under the usual treatment takes from two to eight months to recover and some cases remain permanently deformed. Various contractures occur and leave the face distorted. In some cases excessive treatment to the affected side may over-develop the recovered area and these muscles may over-pull their antagonistic muscles and give an apparent flatness to the unaffected side of the face. Cases of long standing have partial or complete reaction of degeneration in the affected muscles.

Some twenty years ago a woman patient had

a complete Bell's palsy and the usual treatment was assiduously instituted with the result that contractions and partial paralysis have remained. This case caused me to consider carefully the sudden onset of Bell's palsy and its inflammatory nerve condition. The conclusion was reached that the stylo-mastoid foramen partially blocked the swollen nerve and caused an increase in the paralysis. It was thought that possibly if in early cases the nerve swelling could be quickly reduced the paralysis would probably rapidly clear up. While this was in mind an acute case with complete paralysis of less than twenty-four hours standing came under observation. A cantharides plaster, cut in kidney shape, was applied back of this young lady's ear covering the stylo-mastoid foramen and poultices were applied for two days to the paralyzed half of her face. The cantharides plaster was allowed to raise a blister which it did in about six hours. The blister was opened at the lower end and the serum let out. Gratifyingly, the paralysis entirely recovered in less than a week. No massage or electricity was necessary. Since then all of our acute cases have been similarly treated with uniformly prompt recovery. We now use infra-red light to the side of the face in place of the poultice, but the blister is applied as originally. Cases brought in after the paralysis has lasted from several days to a week under this treatment clear up in from ten days to two weeks. If the paralysis has lasted several weeks the treatment should be used but the rapidity of recovery is not so prompt. Skilled massage and carefully given interrupted faradic electricity, if there is no reaction of degeneration, and slow galvanic sinusoidal interrupted current have been valuable aids in the treatment of these cases. In all cases iodides and salicylates are helpful and in long standing cases strychnine should also be used. We frequently use adhesive strips, as suggested by Frazier and Coleman, to help overcome sagging of the various facial muscles. The patient should be cautioned against exposure to cold and draft, as recurrence may take place. In chronic cases if, after thorough treatment the recovery does not occur, the case goes into the realm of neurosurgery.

The plea of this paper is for (1) a definite diagnosis of Bell's palsy excluding those cases due to constitutional disease, to injury or to central lesion; (2) for the localization as accurately as possible of the extent in the fallopian aqueduct of the nerve inflammation; (3) for the prompt institution of the blister and poultice, or blister and heat-light treatment; (4) for the administration of salicylates and iodides in every case; (5) for the use of adhesive strips to prevent facial muscle sagging; (6) for the skilled and regular use of massage and electricity after the acute inflammatory stage and in those cases which come under observation after the paralysis has persisted for several weeks or more.

REFERENCES

1. Tice's System of Medicine. Cranial Nerves and Their Diseases, Vol. X, 1st Sec.
2. Diagnosis of Nervous Diseases, Sixth Edition, pp. 195-202.

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THE PREMATURE INFANT AS A PATIENT*

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Pediatrics and obstetrics were too long in the hands of midwives and the old women of each community rather than under the direction of physicians. Very gradually both became accepted as very respectable divisions of medical practice, and yet there remain in each large fields only partially cultivated. The study of the problems surrounding the premature infant has progressed very satisfactorily in many clinics; excellent research has been done, but the average physician is not applying the available knowledge in an efficient manner. This assertion is in agreement with Dunham,[1] who says:

"One is impressed in traveling about the country with a tendency to leave these infants almost entirely in the hands of nurses."

There is no condition which requires a more specially trained nurse, but, after all, these infants must be considered as patients no matter what the size or weight may be.

The premature infant needs the same ap-

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proach which is applied to the larger patient: history, careful physical examination, laboratory studies, and a differential diagnosis.

Twenty-five per cent of the infant mortality of the city of Louisville was ascribed to prematurity by the death certificates of 1931.[2] The percentage of premature births is variously placed from 7 to 10.[3] In this clinic from 1926 to 1931 premature infants formed 8 per cent of the live births.[2]

In an appraisal study of 6,526 new born infants (*Table 1*) born in the Louisville City Hospital between 1926 and 1931[2] we found a vitality percentage of 95.1 for the group as a whole. For that group, weighing over 2,500 grams at birth, of whom there were 5,988, Group A, the vitality percentage was 97.5. Dividing the smaller babies into 500 gram divisions, we find that Group B, weighing from 2,000 to 2,500 grams, had a vitality percentage of 85; that Group C, weighing from 1,500 to 2,000 grams, had a vitality percentage of 55; and that Group D, weighing from 1,000 to 1,500 grams, had a vitality percentage of 18. The premature group, as a whole, comprising 538 infants, showed a mortality of 31 per cent, or a vitality of 69 per cent. In this clinic, infants weighing less than 1,000 grams have had a 100 per cent mortality during the past 6 years.

The white and colored new-born infants (*Table 2*) as a whole showed very little difference in mortality, the colored being the lower. The premature infant, of whom there were 318 colored and 220 white, showed a greater vitality in the former race. We were quite surprised at this in view of the well known difference in infant mortality for the first year for Louisville and other cities, where the colored infant mortality is often twice that of the white. This study suggests that the colored infant might do as well as the white in the same hygienic surroundings.

The group of the smaller premature infants, weighing from 1,000 to 2,000 grams (*Table 3*), of whom there were 210 in this study, had with us a mortality rate of 54 per cent, and in Hess'[4] recent report a mortality result of 42 per cent.

Table 1

NEW BORN MORTALITY 1926-1931
(Stillborn infants not included)

Groups	Number	Lived*	Died	Per Cent Mortality	Per Cent Vitality
Total	6526	6193	323	4.9	95.1
(A) over 2,500 gms.	5988	5826	152	2.5	97.5
(B) 2,000 to 2,500 gms.	328	276	52	15	85
(C) 1,500 to 2,000 gms.	147	80	67	45	55
(D) 1,000 to 1,500 gms.	63	11	52	82	18
(BCD) 1,000 to 2,500 grams	538	367	171	31	69

This table presents the total number of new born as well as a division into five groups demonstrating death rates according to weight at birth.

The premature group BCD comprises more than one-half of the total mortality.

*"Lived" means that the full-term infant was discharged in good condition at about two weeks of age. For the small babies, "lived" means that they were discharged weighing five to six pounds and in good condition. Mortality in this chart took place at varying lengths of time during the stay in the hospital, for some premature infants, after three months treatment in the hospital.

Table 2

WHITE AND COLORED MORTALITIES IN CONTRAST

Weight	Colored	White	Died Colored	Died White	Mortality Per cent Colored	Mortality Per cent White	Vitality Per Cent Colored	Vitality Per Cent White
All new born	3135	3391	148	175	4.7	5.0	95.3	95
1,000 to 2,500 gms.	318	220	90	81	28	37	72	63
Over 2,500 grams	2817	3171	58	94	2.0	3.6	98	96.4

This table shows colored and white mortalities as a whole, for the premature group, and for the new born infant whose weight is greater than 2500 grams.

Table 3

MORTALITY IN THE SMALLER GROUP OF PREMATURES

Weight	Number	Died	Mortality Per Cent	Vitality Per Cent
1,000 to 2,000 gms.	210	119	54	46
1,000 to 2,000 gms. (Hess[4])	428	183	42	58

This table shows the mortality in the smaller group of premature infants between 1000 and 2000 grams in this clinic and also in Hess' clinic.

Infants weighing less than 1000 grams showed a 100 per cent mortality in this hospital for the past 6 years; in Hess' Clinic a 90 per cent mortality.

Figures in these tables show that weight alone, as has been previously shown by students of the subject, is a primary factor in the mortality of the new born infant. Immediately it will be seen that those infants weighing over 2,500 grams are guaranteed at least 10 per cent greater vitality by that fact alone. The infant weighing less than 1,500 grams had a mortality rate of 82 per cent in contrast with his full-term neighbor whose mortality was 2.5 per cent. We found that this group, as a whole, weighing less than 2,500 but over 1,000 grams, faces almost fifteen times the death rate of a full-term child. The mortality of these different groups has varied in the different years, the total mortality of the premature groups becoming as low as 20 per cent in two consecutive years. However, our general mortality is very similar to that of other places.

These studies also show that one-half of the new born infant mortality in this hospital is due to premature birth.

RECOMMENDATIONS FOR REDUCING THE MORTALITY OF PREMATURE INFANTS

(1) Adoption of a scientific rather than a fatalistic attitude through the acceptance of these small infants as patients by the physicians in charge, or through the immediate transfer of the premature baby to an interested consultant.

(2) A definition of responsibility at the time of the delivery of premature infants and of full-term infants for the carrying out of specialized methods and technic, in the treatment of such conditions as asphyxia, birth injury and thermolability. Methods of resuscitation should be upon a more scientific basis and the responsibility for resuscitation should be assigned. We believe that the care of the premature infant begins at birth rather than a few hours later. In fact, preparations should be made to receive such a patient before the delivery.

(3) Education of those not especially interested in the care of the premature infant in the necessary steps to be taken upon the birth of the infant. For example, we believe that much harm would be avoided by teaching the obstetrician and general practitioner to do only one thing for the first 12 hours, namely: to maintain body temperature and to make no attempt to feed such an infant "temporarily." Consultation should take place before the premature infant is ill.

(4) Better methods of isolation. It is not enough simply to place the infant in a separate part of the hospital. The attention of nurses and interns require certain regulations. Particularly should no nurse be on duty among the premature infants for short periods of time. This part of the training should not be included in the nurse's regular curriculum, but should be for those interested graduate nurses who are willing and anxious to take it up as a specialty, and who will stay for sufficient lengths of time, so that they may be gradually taught the care of the larger premature infant before the very small weak ones are placed in their hands. The rotating intern should be given no responsibility on the premature ward. It should be absolutely under the control of the resident and assistant resident under some attending member of the staff. The junior intern should attend these infants only as an observer.

Where it is economically possible, the premature infant is safer if treated in complete isolation. For those infants whom it is necessary to treat in groups, there should be a small isolated premature hospital or ward with an adequate number of graduate nurses, having in association with it a breast milk dispensary.

BIBLIOGRAPHY

1. Dunham, E. C.: Personal communication.
2. Smith, T. Cook: Premature and Immature Infants. Ky. State Med. Jour., Oct., 1932.
3. Martin, E.: Fruhgeburt und Fruhsterblickeit. Klinische Wochenschrift, 30:1411, July, 1931.
4. Hess, J. H.: The Premature Infant. Penn. Med. Jour., 33: 429, April, 1930.

DISCUSSION (*Abstract*)

Dr. M. Hines Roberts, Atlanta, Ga.—Fortunately the attitude of both obstetrician and general practitioner has undergone a marked change in the past few years and the premature infant is coming into his own. We can hope for a constant enhancement of this chance of survival during the critical new born period.

The following statistics which I quote are derived from the New Born Service of the Grady Hospital, Emory University, an institution for the care of negro patients. During the eight-year period previous to July 1, 1932, there were born 8,730 living negro infants. Of this number, 1,603 weighed 2,500 grams or less, therefore 18.3 per cent may be considered premature.

A study of the charts of 174 premature infants reveals the following facts which in general approximate Dr. Smith's figures. There were 14 infants in this group weighing 1,000 grams or less. One of these babies survived, giving a mortality rate of 92.8 per cent. Between 1,000 and 1,500 grams there were 53 infants, of whom 38 died, giving a mortality of 71.7

per cent. In the groups weighing 1,500 to 2,000 grams 66 prematures were studied. Thirty-four of this number died, or 51.5 per cent, a figure considerably higher than that reported by the essayist. Forty-one of the charts of infants weighing from 2,000 to 2,500 grams were examined. Six of these babies died, giving a mortality of 14.6 per cent. It is interesting to note that in this group of 174 infants syphilis was probably the cause of prematurity in 59, or 33.9 per cent, while toxemia and hypertension were the etiological factors in 51, or 29.2 per cent.

The importance of especially trained nursing personnel for the care of premature infants cannot be overemphasized. The life of these little patients depends largely upon the technic of feeding and general care.

The necessity for breast milk has been so often stressed that reiteration here is unnecessary. However, I feel that I must voice this impression after our experience of about four years with the so-called breast milk station. Pooled breast milk has proved disappointing in the feeding of a considerable number of premature infants. It has been rather surprising to us to watch babies who are progressing indifferently on pooled, boiled breast milk go forward at once when the food is changed to cow's milk in some form. I would not say that these cases are the rule, but it seems to me that they are observed too frequently to be without meaning.

A VITAMIN G (B_2) ASSAY OF TWO COMMERCIAL MEAT EXTRACTS*

By ALFRED CHANUTIN, PH.D.,
and
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Since it is generally conceded that lack of vitamin G in the diet leads to pellagra in the human, it is of some importance to know what materials can be depended upon for a potent source of supply. Animal experimentation and clinical tests have shown that meat, meat by-products and meat and liver extracts are relatively rich in vitamin G.

In 1914, before the role of vitamin G was recognized, Goldberger[1] and his associates, in discussing the treatment of pellagra, stated:

"The meat should be fresh, lean meat. . . . . Where mastication is painful, meat juice may be given instead."

In 1924, Goldberger and Tanner[2] treated a number of pellagrins with fresh beef as the only added factor in the diet and noted clinical improvement. At this time these workers postulated that the missing factor in the diet causing pellagra was due either to a deficiency in the amino acid content of the protein ingested or to a lack of vitamin. During the following year, Goldberger and Tanner[3] concluded that the quality of protein was not the essential factor in preventing pellagra, but that there was "a heretofore unrecognized or unappreciated dietary factor which we designate as factor P-P." Smith and Hendrick,[4] in 1926, demonstrated that the growth-promoting water-soluble vitamin B was made up of two factors: one, an unknown thermostable element, and the other the heat labile antineuritic vitamin. On the basis of evidence obtained by testing dogs suffering from experimental blacktongue, Goldberger[5] and his associates concluded that yeast, beef muscle, pork liver and canned salmon were excellent sources of the P-P factor (vitamin G).

During the last few years it has been shown that water extracts of liver and muscle are potent sources of vitamin G. Chanutin[6] proved that a commercial aqueous liver extract was rich in the vitamin B complex. Salmon and Guerrant[7] assayed the antineuritic and the antipellagra factors in a liver extract and proved that this material was much richer in vitamin G than brewer's yeast. Hoagland and Snider[8] studied a number of commercial meat extracts and fresh lean meat and found that these materials furnished sufficient vitamin G for excellent growth in rats. These workers did not give details concerning the type of meat extract used in this study. Since commercial meat extracts are manufactured by different procedures which involve differences in the method of concentration by heat and the total solids left in the finished product, it was thought advisable to study the relative amounts of vitamin G in two different types of commercial meat extracts.

The experimental procedure followed in determining the vitamin G content of meat extracts was essentially that described by Bourquin and Sherman.[9] This method depends upon the relative rate of growth in young albino rats fed a basal diet plus varying quantities of the material to be tested. The unit of vitamin G is defined as the quantity of test material necessary to induce an average weekly gain of three grams in the test rat over a period of eight weeks. It is first necessary to deplete the vita-

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*From the Laboratory of Physiological Chemistry, University of Virginia, University, Virginia.

min storage by retaining the experimental animals on a vitamin G-free diet for a period of two weeks.

The basal diet used consisted of extracted casein,[10] 18; salt mixture of Osborne and Mendel, 4; cod liver oil (Patch), 2; butter fat, 8; and starch (corn), 68 per cent. Definite proportions of meat extract calculated on the basis of total solid content were added and the starch content in the diet was proportionately reduced. This diet was fed *ad libitum*. Five drops of tiki-tiki (an alcoholic extract of rice polishings) were given in a separate dish daily as a source of the antineuritic vitamin.[11] Male rats, 28 days old, weighing approximately 40 to 50 grams were used at the beginning of the experiment. Each rat was kept in an individual double bottom cage and was weighed twice weekly. An effort to determine the amount of food ingested was unsuccessful because the animals scattered their food.

The fluid meat extract* chosen was found to contain 36.3 per cent of total solids. The manufacturers have kindly furnished an outline of the procedure used in making this product. Fresh lean meat is finely ground and extracted with hot water. The coagulated proteins are removed by filtration and the filtrate is concentrated *in vacuo*. On concentration a large proportion of the insoluble creatine is removed. On filtration a clear concentrated meat extract results. The manufacturers state that 1 c. c. of this meat extract contains the water soluble extractives of approximately 20 grams of fresh lean meat.

The meat extract in paste form* contained 80 per cent total solids. This product is usually obtained by extracting fresh lean meat with boiling water and concentrating to a paste form by evaporation after the removal of fat and protein. Although no definite details are available concerning the production of this material, it is understood that none of the nitrogenous extractives are removed.

The growth of young rats fed diets containing 2.5, 5.0, 7.5 and 10 per cent meat extract is given in *Chart 1*. Several animals fed the vitamin G-free basal ration served as negative controls and one group on the same diet plus 0.5

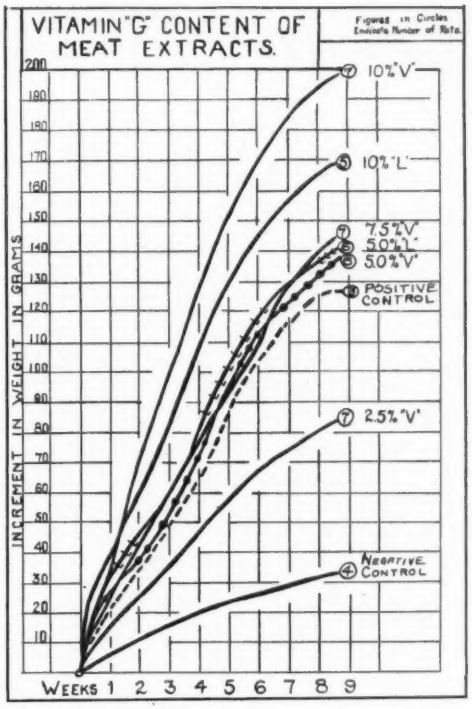

Chart 1

gram of autoclaved yeast (fed daily) was observed as a positive control. It should be noted that these experiments were carried out during a very hot summer period. Levene[12] has recently shown that the rate of growth of rats during July and August was abnormally low.

The negative controls showed a very slight increase in weight. At the end of the eight week period only one of the animals displayed a marked dermatitis about the upper part of the back, shoulders and forelimbs and the remaining two presented a rather emaciated and unkempt appearance. Three positive control animals attained an average increase in weight of 123 grams over a period of 60 days. The last 7 days of this experiment were the hottest of the summer.

There seemed to be very little difference in the growth response between the 5.0 and 7.5 per cent levels of meat extract. There was a definitely greater growth response obtained with the 10 per cent fluid extract than with the paste-

*Given gratis by the Valentine Meat Juice Company, Richmond, Virginia.

*Liebig's Meat Extract (Lemco) purchased on open market.

form of meat extract. It is difficult to explain this discrepancy and such results may be criticized on the basis of inadequate number of animals.

On the basis of Bourquin and Sherman's classification of a unit of vitamin G, the diet containing 2.5 per cent of meat extract would be assayed as slightly more than 3 units.

It is not possible to make direct comparisons of vitamin G assays carried out by other investigators on various types of foodstuffs. The possible differences in basal diets, strain of rats, the effect of temperature, and other slight but important variations must be considered. Our results compare favorably with those of Hoagland and Snider, but are not so striking, since these workers noted optimum growth with diets containing 7.5 per cent of meat extract. It can be stated that meat extract is richer in the pellagra factor than an equivalent amount of dried yeast, when compared in terms of total solids.

SUMMARY

An assay of two meat extracts prepared by slightly different methods showed that both contained an appreciable quantity of vitamin G. This confirms the findings of other investigators.

BIBLIOGRAPHY

1. Goldberger, J.; Waring, C. H.; and Willetts, D. G.: U. S. Public Health Reports, 29:2821, 1914.
2. Goldberger, J.; and Tanner, W. F.: U. S. Public Health Reports, 39:87, 1924.
3. Goldberger, J.; and Tanner, W. F.: U. S. Public Health Reports, 40:54, 1925
4. Smith, M. I.; and Hendrick, E. G.: U. S. Public Health Reports, 41:2, 1926.
5. Goldberger, J.; Wheeler, G. A.; Lillie, R. D.; and Rogers, L. M.: U. S. Public Health Reports, 43:1, 1928.
6. Chanutin, A.: Med. Monthly, 57:637, 1931.
7. Salmon, W. D.; and Guerrant, N. B.: Science, 73:243.
8. Hoagland, R.; and Snider, G. G.: Jour. Agr. Res., 40:977, 1930.
9. Bourquin, A.; and Sherman, H. C.: Jour. Amer. Chem. Soc., 53:3501, 1931.
10. McCollum, E. V.; and Davis, M.: Jour. Biol. Chem., 23: 231, 1915.
11. Evans, H. M.; and Burr, G. O.: Jour. Biol. Chem., 77:231, 1928.
12. Levene, P. A.: Jour. Biol. Chem., 95:317, 1932.

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INSULIN AS A TONIC

One reads more of obesity as a common and undesirable symptom than of its opposite, emaciation. However, the thin person who, with unlimited calories, cannot put on weight, is as unhappy as the fat one whose every pat of butter or bonbon increases his avoirdupois. Attempts at stimulating appetite and metabolism, and increasing the fatty pads of normal underweight individuals through insulin injections, have been numerous in the past few years, beginning in 1923 and 1924. There seems to be little doubt that insulin is effective in bringing about at least a temporary weight increase.

Metz,[1] of Detroit, has recently presented a series of patients in whom, in addition to the rapid weight gains, the red blood count and hemoglobin likewise increased. Blotner,[2] of Boston, noted a similar improvement in the blood picture of thin and anemic subjects who received insulin. The longest period of observation of Metz's patients was three months. Of Blotner's 19 patients, 17 were known to have retained their gain six months after the beginning of treatment. Among the latter cases, a decrease in the per cent of phenolsulphonephthalein excreted by the kidneys during the insulin injections was remarked. Blotner attributes this to increased retention of nutritive materials and considers it a factor in the weight gain. Since phthalein excretion has been taken for many years as an index of kidney function, this interpretation is open to question.

Undernourished patients may be fattened in various ways. The matter of weight maintenance is much less easily controlled. A paper on "Insulin Fattening" by Nichols,[3] of Miami, last year, reported a series of 63 patients observed over several years. Forty-eight made immediate rapid gains. Nearly half of these, however, lost the added fat in three months. Only seven maintained their gain as long as one year.

Insulin, of course, increases the rate of metabolism and storage of carbohydrates. After insulin treatment is stopped a decrease has been reported in the carbohydrate tolerance of normal persons who received it. Upon discontinuance of the injections, sugar appears in the urine and the blood sugar rises considerably above normal limits. Symptoms of mild diabetes temporarily appear.[4] Pancreatic secretion of insulin is apparently depressed in normal individuals when insulin is administered parenterally, and a recovery period is necessary after the treatment before normal pancreatic function is restored. This suppression of secretion is similar to the reaction of the ovaries when active ovarian preparations are given to growing animals. Following prolonged theelin injections into growing animals, the ovary fails to develop. "Administration of an endocrine product depresses the activity of the gland whose function it supplants."[5] There seems to be a quantitative equilibrium toward which the normal body struggles in its control of endocrine output. According to Wilder, Smith and Sandiford,[5] the diabetic reaction after insulin injections is of no significance: no actual involution or atrophy is involved, since the pancreas rapidly returns to normal function.

It is a question whether insulin injections induce a more lasting improvement than other means of feeding undernourished individuals.

1. Metz, R. D.: Insulin in Malnutrition: Further Observations. Ann. Int. Med., 6:743, Dec., 1932.
2. Blotner, Harry: Observations on the Effect of Insulin in Thin Persons. J.A.M.A., 100:88, Jan. 14, 1933.
3. Nichols, E. S.: Insulin Fattening: Late Results in Sixty-three Cases. Sou. Med. Jour., 25:405, 1932.
4. Paul, W. D.; Clark, B. B.; and Gibson, R. B.: Transient Hyperglycemia and Glycosuria Following Discontinuation of Insulin Given Non-Diabetic Patients. Proc. Soc. Exper. Biol. & Med., 30:353, Dec., 1932.
5. Wilder, R. M.; Smith, F. H.; and Sandiford, I.: Observations on Obesity. Ann. Int. Med., 6:724, Dec., 1932.

NEW PREGNANCY TESTS

Sugar, albumin, urea, and organized sediment in urine have been studied for more than a hundred years, and urine examination has been part of the routine of medical investigation since the beginning of civilization. All systems of urinalysis until the past five years overlooked and left entirely unsuspected certain very important organic substances, the hormones, which are excreted at times in very large quantities. The extraordinary reliability of the Aschheim-Zondek pregnancy test, a test of the urine for anterior pituitary hormone, made this method an immediate boon to medicine. The technical difficulties and the time consumed in performing it have interfered of course with its employment in the routine of cases, and a simpler technic is very much to be desired. The Friedman modification has been widely used, and a number of other pregnancy tests are being tried.

One of the new tests depends upon the instillation into a woman's eye of a few drops of her own blood. The pupil in positive cases within a few minutes either contracts or expands, the other eye being used as control. The reaction is a little difficult to read. Epinephrine injections sometimes show the same effect; the reaction is occasionally positive in non-pregnant women and in men. According to King,[1] of New Orleans, this reaction, the Bercovitz reaction, was positive in 68 per cent of a series of more than a hundred gravid women. The Aschheim-Zondek and Friedman tests, of course, are correct in as nearly as 100 per cent of cases as it is possible for a laboratory test to be correct. The Bercovitz test is of theoretical interest, but is not practical.

Two other new and rapid pregnancy tests, which are claimed to be as accurate as the Aschheim-Zondek, have been described by Markee,[2] of Stanford University. The Aschheim-Zondek and Friedman tests are presumed to depend upon the activity of the anterior pituitary sex hormone, which appears in the urine of pregnancy in large quantities a very few days after conception. Later in gestation there is a characteristic increase of another hormone, the follicular hormone (estrin or theelin), which in early pregnancy is suppressed. In the first few weeks of pregnancy, as a matter of fact, injections of theelin cause abortion. One of Markee's tests indicates the presence of the anterior pituitary hormone; the other of theelin.

An endometrial transplant is made into the eye of a rabbit, and this piece of uterine tissue, which may be observed without laparotomy, shows characteristic color changes which are interrupted after the animal has been injected intravenously with the urine under examination, or with a concentrate. By one method very early pregnancy may be detected in eight hours, and the same rabbit may be used every three weeks. By the other method, after concentration of the specimen of urine, pregnancy of around two months' duration may be detected in two hours, and the same rabbit may be used every three days. In both, a rabbit with an endometrial transplant in its eye is required, but the necessity is abolished of opening the abdomen of the animal before or after the injections.

These technics are not sufficiently evaluated for routine clinical use. They merely serve to show that a simpler technic is in the offing. If detection of urinary and blood hormones is made easy, of course, one may expect an early flood of information as to variations from the normal in other conditions than pregnancy.

1. King, Arthur G.: The Bercovitz Test for Pregnancy. Amer. Jour. Obst. and Gyn., 25:99, Jan., 1933.
2. Markee, J. E.: Two Rapid Tests for Pregnancy. Surg., Gyn. & Obst., 56:51, Jan., 1933.

GLEANINGS FROM RECENT JOURNALS

A New Iodine Compound for Intravenous Urography.—Hippuric acid is normally excreted in the urine of horses. It occurs in human urine in small amounts, particularly after the ingestion of large quantities of vegetables. Sodium benzoate, a food preservative, is detoxified in the body by changing to hippuric acid, which apparently passes the kidneys without damaging them. Swick[1] describes the use of a radiopaque iodine-hippuric acid compound for intravenous urography. The substance, he reports, gives satisfactory radiograms, is well tolerated by the body, is highly water-soluble, and is relatively inexpensive.

An Experimental Trachoma-like Condition in Rabbits.—In attempts to transmit trachoma to animals, a significant and refractory difficulty is the complete lack of corneal involvement which results. The appearance of cicatricial changes and pannus comprise the essential diagnostic difference between trachoma and follicu-

1. Swick, M.: Excretion Urography by Means of the Intravenous and Oral Administration of Sodium Ortho-iodo-hippurate, with Some Physiological Considerations: Preliminary Report. Surg., Gyn. & Obst., 56:62, Jan., 1933.

losis. Julianelle and Morris[2] report the formation of a pannus in rabbits which have been made hypersensitive to several varieties of living bacteria, for example: *S. aureus*, pneumococcus, and streptococci. They produced the same condition in the rabbits by sensitizing them to simple protein such as egg albumin.

Apples and Diarrhea.—It has been a time-honored custom in cases of acute diarrhea to withhold fresh fruits and fruit juices which are believed to be laxative. Vegetables with a residue have also usually been avoided. Starvation, dextrose, corn syrup, broths, toast or milk have variously and separately been offered for therapy of this well-known disease.

According to Tobias L. Birnberg,[3] of St. Paul, in the *American Journal of Diseases of Children*, "The efficacy of a raw apple diet in the treatment of diarrheal conditions in children has long been known by the populace in many parts of Germany." It has received occasional brief mention by medical authorities. Birnberg reports a series of 70 patients successfully treated, to whom he administered nothing but grated ripe raw apple. Five hundred or more grams daily for two days, in small portions, were given, in diarrheas of long or short standing, to children from the ages of three months to ten years. If the child is very toxic or craves liquids, he says, it may be given weak black tea. Some of his patients were having convulsions before treatment. There were no convulsions during or after the administration of raw apple. He discusses the chemical explanation of his fortunate results: whether they were due to the tannic acid of the apple, the malic acid, the pectin, or the protective colloids.

This paper has an archaic ring. The author's explanations, rather than his therapy, are to be criticized. If one judges from text books, there is probably no department of medicine in which still flourishes more dogma and guess work than in clinical dietary prescribing. The theory of a specific curative food for a specific disorder, if one excepts the known deficiency diseases, is an inverted pyramid with a slim point contacting earth. There is no human ailment in which it has been shown that for a period of a few days black tea is better than green, grated raw apple than grated raw pear, raspberry, orange or almonds; and one might with reservations include barley or chicken broth or oatmeal crackers.

Birnberg's paper has the value of emphasizing the fact that a considerable quantity of a fresh raw fruit during diarrheal attacks does not act as an intestinal irritant.

2. Julianelle, L. A.; and Morris, N. C.: A Study of Pannus Formation in the Cornea of Rabbits. Proc. Soc. Exper. Biol. & Med., 30:295, Dec., 1932.

3. Birnberg, T. L.: Raw Apple Diet in the Treatment of Diarrheal Conditions in Children. Amer. Jour. Dis. Child., 45:18, Jan., 1933.

TWENTY-FIVE YEARS AGO

From title page of Volume 1 of the SOUTHERN MEDICAL JOURNAL, 1908:

"Editorial offices, 529½ Church Street, Nashville, Tennessee.

"Editorial Staff: J. A. Witherspoon, M.D., Editor-in-Chief. W. S. Bryan, M.D., and J. M. King, M.D., Managing Editors.

"Each number contains one hundred pages of well-illustrated reading matter and advertisements.

"No 'hobby' or 'scheme' of any individual school or locality is promoted, and no advertisements of questionable character appear in it. The sole purpose and aim of all connected with the JOURNAL is to advance the interests of the entire Southern medical profession."

Letters received upon beginning of publication of new JOURNAL:

"I shall be glad to do anything that I can to further the interest of the JOURNAL in Alabama. There is certainly a field for such a medical journal as you propose."—SEALE HARRIS, M.D., *Mobile, Ala.*

"The JOURNAL should be a success, and I trust will be from the very first. . . . . Try to have some articles detailing original research or work—not all compilations."—W. H. POWERS, M.D., *Ocala, Fla.*

"The first two issues of the SOUTHERN MEDICAL JOURNAL have been carefully read by me, and it is simple conformity to the logic of the situation that bids me congratulate you on your product. As a distinctly Southern creation it stands without a rival."—W. W. CRAWFORD, *Hattiesburg, Miss.*

Abstract J.A.M.A., 50:1635, 1908, from the Proceedings of the Medical Association of Alabama:

"Dr. D. F. Talley said that there has been much discussion recently as to the best method of treating goiter, and the internist has come to admit that in many cases surgical treatment is not only the best but the only treatment which offers any hope of permanent relief. Good and scientific work is being done by Rogers and Beebe in obtaining a cytotoxic serum which has been used with benefit, but this serum is difficult to prepare and may not be of uniform strength always."

Book Reviews

The Races of Man. Differential and Dispersal of Man. By Robert Bennett Bean, M.D., Professor of Anatomy, University of Virginia School of Medicine, University, Virginia. New York: The University Society, Inc., 1932.

The author of this entertaining and informative volume ranks as one of the foremost anthropologists in this country. He tells the story of man's development in two more or less sharply defined parts. After giving the reader a brief view of prehistoric peoples, the first section deals with the evolution of the primates

from their origin to the appearance of Neanderthal man. Especial attention is paid to the development of the brain and mental expansion. The reasons why certain species developed brains of high activity or superior intelligence, and others failed so to develop, or at least developed in other directions, more specialized but less broad, are clearly brought out. The rise of the primates above other mammals, and of man above other primates, is explained and traced with fascinating vividness. Two outstanding reasons are furnished for this superior development of man over other primates: emancipation from the bondage of smell, and the development of vision, touch and hearing. After development in these lines came the correlation of the senses and cooperation in motor activities, especially speech.

The second part of this treatise, and perhaps the part which is considered by the author as the major study, concerns itself with the formation or development of races.

The story is told of the "movements of man as he wandered to and fro over the face of the earth." During these wanderings Neanderthal man became divided into the three great or major races: the black, the yellow-brown, and the white.

The author points out the localities in which the three great races probably developed and as these migrations are continued and enlarged he unfolds the beginnings of lesser races and species.

In the final chapters, Modern Man is considered. A useful discussion of differentiating characteristics, mainly physical, of the numerous lesser races, enables one with comparatively slight technical knowledge to make fairly accurate determinations of nationality. The few remaining "pure" races are noted, and the influence of hybridization is briefly discussed. A useful, simple and easily understood classification of man closes this very readable handbook. A glossary and a list of references for further reading, together with a number of diagrams of chronology and the excellent illustrations, add to its usefulness.

Southern Medical News

GENERAL

The Dallas Southern Clinical Society, Annual Spring Clinical Congress, will be held at Dallas, Texas, March 27-31, at the Baker Hotel. Program and other information available from the Secretary, Dr. W. G. Reddick, 610 Medical Arts Building, Dallas, Texas.

The Panamerican Medical Association, Fourth Congress, will be held in Dallas, Texas, March 21-25. Program and other information available from the Executive Secretary, Dr. J. E. Lopez Silvero, Malecon 15, Havana, Cuba, or from the President of the Congress, Dr. John O. McReynolds, Mercantile Building, Dallas, Texas.

The Southeastern Surgical Congress, Annual Assembly, will be held in Atlanta, Georgia, March 6-8, at the Biltmore Hotel. Program and other information available from the Secretary, Dr. B. T. Beasley, Doctors Building, Atlanta, Georgia.

ALABAMA

Dr. Lloyd Noland, Birmingham, was elected Treasurer of the Southern Surgical Association at its meeting in Miami in December.

Deaths

Dr. Harvey Caloway Johnson, Nauvoo, aged 75, died December 19 of injuries received in a fall.

Dr. Jesse Monroe Cobb, Grove Hill, aged 61, died December 4 of carcinoma of the throat.

Dr. Samuel Clark, Cochrane, aged 74, died December 15 of heart disease.

Dr. David Sanders Moore, Altoona, aged 80, died December 9 in a Birmingham hospital of pneumonia.

Dr. Lewis Edward Broughton, Andalusia, aged 63, died January 27.

Dr. William M. Mastin, Mobile, died in February.

Dr. Edgar Collins, Birmingham, aged 48, died December 30.

ARKANSAS

Dr. Walter M. Matthews, Jr., Little Rock, has succeeded the late Dr. Robert B. Corney as chief medical officer for the Little Rock regional office of the Veterans' Administration.

Deaths

Dr. George Arthur Wilson, Little Rock, aged 55, died October 7.

DISTRICT OF COLUMBIA

George Washington University School of Medicine, Washington, has created an honorary medical society to be known as the Smith-Reed-Russell Society, in honor of Dr. Theobald Smith, Dr. Walter Reed and Dr. Frederick F. Russell, all at one time members of the faculty of the Medical School. The Society will be composed of second, third and fourth year medical students having a scholastic average of 86 or above. The Society held their inaugural banquet in January.

Deaths

Dr. Adajah Behrend, Washington, aged 91, died December 27 of bronchopneumonia and influenza.

Dr. Timothy E. Wilcox, Washington, aged 92, died December 10 of arteriosclerosis and cerebral hemorrhage.

Dr. Joseph D. Rogers, Washington, aged 52, died January 12.

FLORIDA

The Alachua County Medical Society has elected the following officers for the coming year: Dr. J. L. Summerlin, President; Dr. J. Maxey Dell, First Vice-President; Dr. R. E. Summitt, Second Vice-President; and Dr. J. Maxey Dell, Jr., Secretary-Treasurer; all of Gainesville.

The Brevard County Medical Society has elected the following officers for the coming year: Dr. W. J. Creel, Eau Gallie, President; Dr. Robert Schlernitzauer, Cocoa, Vice-President; and Dr. I. K. Hicks, Melbourne, Secretary-Treasurer.

The Dade County Medical Society has elected the following officers for the coming year: Dr. Gerard Raap, President; Dr. George N. MacDonell, Vice-President; Dr. Robert T. Spicer, Secretary; and Dr. H. A. Barge, Treasurer; all of Miami.

The DeSoto-Hardee-Highlands County Medical Society has elected the following officers for the coming year: Dr. J. A. Simmons, Arcadia, President; Dr. G. F. Highsmith, Arcadia, Vice-President; and Dr. L. W. Martin, Sebring, Secretary-Treasurer.

The Duval County Medical Society has elected the following officers for the coming year: Dr. J. Knox Simpson, President; Dr. Kenneth Morris, Vice-President; Dr. F. L. Fort, Secretary; and Dr. E. C. Swift, Treasurer; all of Jacksonville.

The Escambia County Medical Society has elected the following officers for the coming year: Dr. J. C. Heinberg, President; Dr. Alvyn White, Vice-President; and Dr. J. M. Hoffman, Secretary-Treasurer; all of Pensacola.

The Hillsboro County Medical Society has elected the following officers for the coming year: Dr. E. H. McRae, President; Dr. Edward Smoak, Vice-President; and Dr. C. W. Bartlett, Secretary-Treasurer; all of Tampa.

The Marion County Medical Society has elected the following officers for the coming year: Dr. J. L. Strange, McIntosh, President; Dr. A. H. Freeman, Ocala, Vice-President; and Dr. W. B. Jordan, Ocala, Secretary-Treasurer.

The Orange County Medical Society has elected the following officers for the coming year: Dr. Hewitt Johnston, President; Dr. J. R. Chappell, Vice-President; Dr. Louis Orr, Secretary; and Dr. Charles Collins, Treasurer; all of Orlando.

The Polk County Medical Society has elected the following officers for the coming year: Dr. W. T. Simpson, Winter Haven, President; Dr. H. B. Cordes, Frostproof, Vice-President; and Dr. J. R. Boulware, Jr., Lakeland, Secretary-Treasurer.

The Sarasota County Medical Society has elected the following officers for the coming year: Dr. O. H. Cribbins, President; Dr. T. W. Taylor, Vice-President; and Dr. J. E. Harris, Secretary-Treasurer; all of Sarasota.

The Seminole County Medical Society has elected the following officers for the coming year: Dr. J. N. Tolar, President; Dr. A. W. Knox, Vice-President; and Dr. J. T. Denton, Secretary-Treasurer; all of Sanford.

Continued on page 304

Officers

OFFICERS 1932-1933

The following is a complete roster of the officers of the Southern Medical Association for 1932-1933, and of organizations meeting conjointly with the Southern Medical Association:

President—Dr. Irvin Abell, Louisville, Kentucky.

First Vice-President—Dr. James R. Garber, Birmingham, Alabama.

Second Vice-President—Dr. Hugh J. Morgan, Nashville, Tennessee.

Secretary-Manager—Mr. C. P. Loranz, Birmingham, Alabama.

Editor of Journal—Dr. M. Y. Dabney, Birmingham, Alabama.

Assistant Editor of Journal—Mrs. Eugenia B. Dabney, Birmingham, Alabama.

Councilors—Dr. Homer Dupuy, Chairman, New Orleans, Louisiana; Dr. M. Toulmin Gaines, Mobile, Alabama; Dr. Morgan Smith, Little Rock, Arkansas; Dr. William Gerry Morgan, Washington, D. C.; Dr. Edward Jelks, Jacksonville, Florida; Dr. Frank K. Boland, Atlanta, Georgia; Dr. C. W. Dowden, Louisville, Kentucky; Dr. Edward A. Looper, Baltimore, Maryland; Dr. Inman W. Cooper, Meridian, Mississippi; Dr. M. Pinson Neal, Columbia, Missouri; Dr. Paul H. Ringer, Asheville, North Carolina; Dr. Lea A. Riely, Oklahoma City, Oklahoma; Dr. Frank H. McLeod, Florence, South Carolina; Dr. Eugene Rosamond, Memphis, Tennessee; Dr. Elbert Dunlap, Dallas, Texas; Dr. R. Finley Gayle, Jr., Richmond, Virginia; Dr. James R. Bloss, Huntington, West Virginia.

Board of Trustees (All are Past-Presidents)—Dr. J. Shelton Horsley, Chairman, Richmond, Virginia; Dr. William R. Bathurst, Little Rock, Arkansas; Dr. Thomas W. Moore, Huntington, West Virginia; Dr. Hugh S. Cumming, Washington, D. C.; Dr. Felix J. Underwood, Jackson, Mississippi; Dr. L. J. Moorman, Oklahoma City, Oklahoma.

Section on Medicine—Dr. I. I. Lemann, Chairman, New Orleans, Louisiana; Dr. Cabot Lull, Vice-Chairman, Birmingham, Alabama; Dr. Ernest B. Bradley, Secretary, Lexington, Kentucky.

Section on Pediatrics—Dr. Hugh L. Dwyer, Chairman, Kansas City, Missouri; Dr. Charles E. Conrad, Vice-Chairman, Harrisonburg, Virginia; Dr. Luther W. Holloway, Secretary, Jacksonville, Florida.

Section on Gastroenterology—Dr. Daniel N. Silverman, Chairman, New Orleans, Louisiana; Dr. James Alto Ward, Vice-Chairman, Birmingham, Alabama; Dr. Ernest H. Gaither, Secretary, Baltimore, Maryland.

Section on Pathology—Dr. J. A. McIntosh, Chairman, Memphis, Tennessee; Dr. Harvey S. Thatcher, Vice-Chairman, Little Rock, Arkansas; Dr. Wiley D. Forbus, Secretary, Durham, North Carolina.

Section on Neurology and Psychiatry—Dr. R. G. Spurling, Chairman, Louisville, Kentucky; Dr. W. W. Young, Vice-Chairman, Atlanta, Georgia; Dr. J. H. Royster, Secretary, Richmond, Virginia.

Section on Radiology—Dr. C. H. Heacock, Chairman, Memphis, Tennessee; Dr. K. F. Kesmodel, Vice-Chairman, Birmingham, Alabama; Dr. Vincent W. Archer, Secretary, University, Virginia.

Section on Dermatology and Syphilology—Dr. Andrew L. Glaze, Chairman, Birmingham, Alabama; Dr. Jack W. Jones, Vice-Chairman, Atlanta, Georgia; Dr. Dudley C. Smith, Secretary, University, Virginia.

Section on Surgery—Dr. Edwin P. Lehman, Chairman, University, Virginia; Dr. Samuel L. Ledbetter, Jr., Vice-Chairman, Birmingham, Alabama; Dr. Daniel C. Elkin, Secretary, Atlanta, Georgia.

Section on Bone and Joint Surgery—Dr. J. Albert Key, Chairman, St. Louis, Missouri; Dr. H. Earle Conwell, Vice-Chairman, Fairfield, Alabama; Dr. J. Warren White, Secretary, Greenville, South Carolina.

Section on Gynecology—Dr. Percy H. Wood, Chairman, Memphis, Tennessee; Dr. John W. Turner, Vice-Chairman, Atlanta, Georgia; Dr. Lee F. Turlington, Secretary, Birmingham, Alabama.

Section on Obstetrics—Dr. E. L. King, Chairman, New Orleans, Louisiana; *Dr. Percy W. Toombs, Vice-Chairman, Memphis, Tennessee; Dr. Richard Paddock, Secretary, St. Louis, Missouri.

Section on Urology—Dr. Nelse F. Ockerblad, Chairman, Kansas City, Missouri; Dr. I. G. Duncan, Vice-Chairman, Memphis, Tennessee; Dr. Hamilton W. McKay, Secretary, Charlotte, North Carolina.

Section on Railway Surgery—Dr. E. Dunbar Newell, Chairman, Chattanooga, Tennessee; Dr. S. O. Black, Vice-Chairman, Spartanburg, South Carolina; Dr. J. W. Palmer, Secretary, Ailey, Georgia.

Section on Ophthalmology and Otolaryngology—Dr. William D. Gill, Chairman, San Antonio, Texas; Dr. E. W. Rucker, Jr., Vice-Chairman, Birmingham, Alabama; Dr. William A. Wagner, Secretary, New Orleans, Louisiana.

Section on Medical Education—Dr. John Walker Moore, Chairman, Louisville, Kentucky; Dr. Earl B. McKinley, Vice-Chairman, Washington, D. C.; Dr. Ernest W. Goodpasture, Secretary, Nashville, Tennessee.

Section on Public Health—Dr. Joseph W. Mountin, Chairman, Washington, D. C.; Dr. Leon Banov, Vice-Chairman, Charleston, South Carolina; Dr. Douglas L. Cannon, Secretary, Montgomery, Alabama.

National Malaria Committee (meeting conjointly with Southern Medical Association)—Dr. L. O. Howard, Honorary Chairman, Washington, D. C.; Dr. Charles F. Craig, Chairman, New Orleans, Louisiana; Dr. Henry Hanson, Chairman-Elect, Jacksonville, Florida; Dr. L. L. Williams, Jr., Vice-Chairman, Washington, D. C.; Dr. Mark F. Boyd, Secretary-Treasurer, Tallahassee, Florida.

American Society of Tropical Medicine (meeting conjointly with Southern Medical Association)—Dr. G. R. Callender, President, Fort Sam Houston, Texas; Dr. A. W. Sellards, First Vice-President, Boston, Massachusetts; Dr. W. A. Sawyer, Second Vice-President, New York, New York; Dr. Henry E. Meleney, Secretary-Treasurer, Nashville, Tennessee; Dr. Damaso de Rivas, Assistant Secretary, Philadelphia, Pennsylvania.

American Public Health Association, Southern Branch (meeting conjointly with Southern Medical Association)—Dr. E. L. Bishop, President, Nashville, Tennessee; Dr. J. H. Mason Knox, Jr., First Vice-President, Baltimore, Maryland; Dr. J. D. Dowling, Second Vice-President, Birmingham, Alabama; Miss Margaret East, Third Vice-President, Louisville, Kentucky; Dr. R. H. White, Secretary-Treasurer, Nashville, Tennessee.

Society for Experimental Biology and Medicine, Southern Section (meeting conjointly with Southern Medical Association)—Dr. William H. Harris, Chairman, New Orleans, Louisiana; Dr. Ernest Carroll Faust, Vice-Chairman, New Orleans, Louisiana; Dr. Harold Cummins, Secretary, New Orleans, Louisiana.

Southern Association of Anesthetists (meeting conjointly with Southern Medical Association)—Dr. H. Boyd Stewart, President, Tulsa, Oklahoma; Dr. Mary E. Hopkins, First Vice-President, Louisville, Kentucky; Dr. D. P. Harris, Second Vice-President, Beaumont, Texas; Dr. W. Hamilton Long, Secretary-Treasurer, Louisville, Kentucky.

Women Physicians of Southern Medical Association—Dr. Ray K. Daily, Chairman, Houston, Texas; Dr. Rosalie Slaughter Morton, Vice-Chairman, Winter Park, Florida; Dr. Willena Peck, Secretary, Montevallo, Alabama.

Woman's Auxiliary to the Southern Medical Association—Mrs. A. A. Herold, President, Shreveport, Louisiana; Mrs. Southgate Leigh, President-Elect, Norfolk, Virginia; Mrs. J. Bonar White, First Vice-President, Atlanta, Georgia; Mrs. Sidney W. Collier, Second Vice-President, Birmingham, Alabama; Mrs. Earl D. McBride, Recording Secretary, Oklahoma City, Oklahoma; Mrs. C. B. Erickson, Corresponding Secretary, Shreveport, Louisiana; Mrs. W. B. Majors, Treasurer, Birmingham, Alabama; Mrs. J. D. Thompson, Historian, Port Arthur, Texas; Mrs. V. A. Stilley, Parliamentarian, Benton, Kentcky.

*Deceased.

Continued from page 302

The Volusia County Medical Society has elected the following officers for the coming year: Dr. L. B. Bouchelle, New Smyrna, President; Dr. Roy Howe, Daytona Beach, Vice-President; and Dr. J. H. Rutter, Daytona Beach, Secretary-Treasurer.

Dr. J. D. Griffin, Lakeland, is the newly elected President of the Staff of the Morrell Memorial Hospital at Lakeland; Dr. Herman Watson, Vice-President; and Dr. G. C. Overstreet, Secretary-Treasurer.

The Staff of the Pensacola Hospital has elected the following officers for the coming year: Dr. C. W. D'Alemberte, President; Dr. A. M. Ames, Vice-President; and Dr. J. D. Bell, Secretary; all of Pensacola.

Dr. Samuel A. Clarke, Lakeland, was elected President of the Florida Midland Medical Society at a recent meeting.

Dr. B. D. Epling, Lake Wales, has reopened offices in the Rhodesbilt Arcade.

Dr. Raymond Howe, Daytona Beach, is the newly elected Chief of Staff of the Halifax Hospital at Daytona Beach.

Dr. J. A. Strickland, St. Petersburg, was recently honored, as the new President of the Club, with a dinner dance given him by the Shrine Club of St. Petersburg.

Dr. Frederick Oetjen, Jacksonville, has moved into new offices in the Smith Building.

Dr. Edward Jelks, Jacksonville, has been elected a Fellow of the Southern Surgical Association.

Dr. Howard Bucknell has moved from Clearwater to Atlanta, Georgia, where he will resume the practice of pediatrics.

Dr. W. E. Morgan has moved from Tarpon Springs to Chicago to practice.

Deaths

Dr. James Erwin Reed, Bartow, aged 80, died November 10 of heart disease.

Dr. Daniel L. McSwain, Arcadia, aged 62, died January 28.

GEORGIA

The Cobb County Medical Society has elected the following officers for 1933: Dr. G. F. Haygood, Marietta, President; Dr. A. H. Fowler, Smyrna, Vice-President; and Dr. Henry W. Crouch, Marietta, Secretary-Treasurer.

The Dougherty County Medical Society has elected the following officers for 1933: Dr. I. W. Irvin, President; Dr. H. M. McKemie, Vice-President; and Dr. I. M. Lucas, Secretary-Treasurer; all of Albany.

The Georgia Medical Society (Chatham County) has elected the following officers for 1933: Dr. H. L. Levington, President-Elect; Dr. L. B. Dunn, Vice-President; and Dr. Otto W. Schwalb, Secretary-Treasurer; all of Savannah. Dr. Robert Drane, Savannah, is the incoming President of the Society.

The Habersham County Medical Society has elected the following officers for the coming year: Dr. W. V. Chandler, Baldwin, President; Dr. P. Y. Duckett, Cornelia, Vice-President; and Dr. O. N. Harden, Cornelia, Secretary-Treasurer.

The Hall County Medical Society has elected the following officers for 1933: Dr. Pratt Cheek, President; Dr. J. L. Meeks, Vice-President; and Dr. W. R. Garner, Secretary-Treasurer; all of Gainesville.

The Lowndes County Medical Society has elected the following officers for 1933: Dr. E. P. Quillian, Clyattville, President; Dr. B. G. Owens, Valdosta, Vice-President; and Dr. Gordon T. Crozier, Valdosta, Secretary-Treasurer.

The Macon Medical Society (Bibb County) has elected the following officers for the coming year: Dr. Thomas Harold, President; Dr. Wallace Bazemore, Vice-President; and Dr. Leon D. Porch, Secretary-Treasurer; all of Macon.

The Monroe County Medical Society has elected the following officers for 1933: Dr. W. J. Smith, Juliette, President; Dr. J. O. Elrod, Forsyth, Vice-President; and Dr. G. H. Alexander, Forsyth, Secretary-Treasurer.

The Spalding County Medical Society has elected the following officers for 1933: Dr. R. E. L. English, Experiment, President; Dr. K. S. Hunt, Griffin, Vice-President; and Dr. H. J. Copeland, Griffin, Secretary-Treasurer.

The Terrell County Medical Society has elected the following officers for 1933: Dr. Guy Chappell, President; Dr. Lucius Lamar, Vice-President; and Dr. Logan Thomas, Secretary-Treasurer; all of Dawson.

The Thomas County Medical Society has elected the following

Continued on page 20

DALLAS SOUTHERN CLINICAL SOCIETY

LEADS IN 1933 POST-GRADUATE STUDY

Fifth Annual Spring Clinical Conference Meets in Dallas

MARCH 27th to 31st, 1933, INCLUSIVE—5 BIG DAYS

Addresses and Teaching Clinics by the following Honor Guests:

CYRUS N. STURGIS, **Medicine,** University of Michigan, Ann Arbor.
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CHARLES C. DENNIE, **Dermatology,** University of Kansas, Kansas City.
PERCIVAL BAILEY, **Neurology,** University of Chicago, Chicago.
JOSEPH BRENNEMANN, **Pediatrics,** University of Chicago, Chicago.
THOS. B. HOLLOWAY, **Ophthalmology,** Univ. of Pennsylvania, Philadelphia.
EUGENE R. LEWIS, **Ophthalmology and Oto-laryngology,** Los Angeles.
ARTHUR E. HERTZLER, **Surgery,** University of Kansas, Halstead, Kansas.
HENRY S. CROSSEN, **Gynecology,** Washington University, St. Louis.
PHILIP KREUSCHER, **Orthopedic Surgery,** Loyola University, Chicago.
JOSEPH F. McCARTHY, **Urology,** N. Y. Post-Graduate Med., New York.
LOUIS A. BUIE, **Proctology,** Mayo Clinic, Rochester.

Public Meeting Monday Night. 4 Symposia—Tuesday and Wednesday Nights.
Alumni and Clinic Dinner Thursday Night. "Wet" Clinics Friday.
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With exception of afternoon Hospital Clinics, all other features under one roof.

For further information and prospectus, write

THE SECRETARY, DALLAS SOUTHERN CLINICAL SOCIETY
610 Medical Arts Building, Dallas, Texas

"CURRENT COMMENT"
FROM THE A. M. A.—DECEMBER 17, 1932

They say!

". . . the United States Public Health Service indicates that some 200,000 persons had pellagra in 1929. The cases occurred mostly in the South in families of LOW INCOME*. . . . The studies indicated that some people can store the pellagra preventing factor better than others, which explains why some people come down with the disease in certain families whereas others do not."*

*THAT MEANS EVERYONE IN 1933

They advise

". . . 1 ounce of pure dried yeast per person daily to the food supply customarily used in winter and early spring is sufficient to reduce greatly the incidence of pellagra among those people who are likely, in times of economic depression, to live largely on monotonous and one-sided diets."

The remedy

In describing their curative results with 26 cases of pellagra in Georgia, when using Brewers' Yeast-Harris, Drs. Goldberger and Tanner (U.S.P.H. Service) advise, in "Public Health Reports, January 1925," 1/2 oz. to 1 oz. Brewers' Yeast-Harris, daily, mixed with any part of the food, as desired.

BREWERS' YEAST
—POWDER—
Widely used for pellagra, sprue, herpes, anemias and true anorexia.

—FREE SAMPLES TO PHYSICIANS—

The HARRIS LABORATORIES
TUCKAHOE, NEW YORK

TESTED STANDARDS

Continued from page 304

officers for 1933: Dr. J. I. Palmer, President; Dr. Rudolph Bell, Vice-President; and Dr. H. M. Moore, Secretary-Treasurer; all of Thomasville.

The Tift County Medical Society has elected the following officers for 1933: Dr. V. F. Dinsmore, President; and Dr. Carlton A. Fleming, Secretary-Treasurer; both of Tifton.

The Tri County Medical Society (Calhoun, Early, Miller) has elected the following officers for 1933: Dr. G. O. Gunther, Blakely, President; Dr. W. C. Hays, Colquitt, Vice-President; and Dr. W. O. Shepard, Bluffton, Secretary-Treasurer.

The Ware County Medical Society has elected the following officers for 1933: Dr. C. A. Witmer, President; Dr. A. W. DeLoach, Vice-President; and Dr. K. McCullough, Secretary-Treasurer; all of Waycross.

Dr. W. Frank Wells, Atlanta, has been reelected Chairman of the Fulton County Board of Health; and Dr. W. N. Adkins, Atlanta, was reelected Secretary.

The Georgia State Tuberculosis Sanatorium, Alto, recently had the dedication of the Thomas County Cottage of the Sanatorium.

Dr. J. E. Sommerfield, Atlanta, has moved into new offices at 360 Ponce de Leon Avenue, Northeast.

Dr. D. M. Bradley, Waycross, is the newly elected County Commissioner of Health for Ware County.

Dr. and Mrs. J. P. Prescott, Lake Park, were hosts recently to the members of the Lowndes County Medical Society.

The Ben Hill County Medical Society sponsored tuberculosis clinics in February for the examination, diagnosis and treatment of patients with tuberculosis or suspected tuberculosis, these clinics being in charge of the Georgia Department of Public Health.

Dr. S. H. Haddock, formerly of Millen and Augusta, has moved to Anderson, South Carolina, where he will practice pediatrics.

Dr. and Mrs. W. H. Hendricks, Tifton, were hosts recently to members of the Tift County Medical Society.

Dr. and Mrs. H. E. Crow, Alto, were hosts recently to members of the Habersham County Medical Society and Auxiliary.

The Emory University Hospital Visiting Staff Association has elected the following officers for 1933: Dr. George Bachmann, Emory University, President; Dr. J. J. Clark, Atlanta, Vice-President; and Dr. J. D. Martin, Jr., Atlanta, reelected Secretary-Treasurer.

Dr. Logan Thomas, Dawson, was recently reelected Historian of the W. C. Davis Camp No. 15 of the United States Spanish War Veterans.

Dr. J. R. Dykes, Cairo, has been reelected Commissioner of Health by the Grady County Board of Health for 1933.

Dr. J. P. Palmer, Atlanta, formerly on the Staff of Steiner Cancer Clinic at Atlanta, has resigned to accept a position on the Staff of the U. S. Veterans' Hospital, Hines, Illinois.

Dr. J. E. Penland, Waycross, is the newly elected Commissioner of Health for Ware County.

Dr. John A. Rhodes, Crawfordville, has been elected County Physician for Taliaferro County for two years.

Dr. Richard Binion, Milledgeville, was recently reelected County Physician for Baldwin County.

Dr. Ben H. Clifton, Atlanta, is the newly elected President of the Medical and Surgical Staff of the Georgia Baptist Hospital.

Dr. Carl B. Welch and Miss Cornelia Lester, both of Bainbridge, were married recently.

Deaths

Dr. Robert Lee Rogers, Fair Mount, aged 62, died December 10 in an Atlanta hospital of septicemia.

Dr. James Wimberly Patterson, Dawson, aged 69, died December 7 of diabetes mellitus.

Dr. Robert E. L. Burford, Brunswick, aged 71, died December 1 of myocarditis and influenza.

Dr. Russell A. Hardaway, East Point, aged 54, died December 22 of coronary thrombosis.

Dr. Louis Warren Fargo, Augusta, aged 80, died December 14.

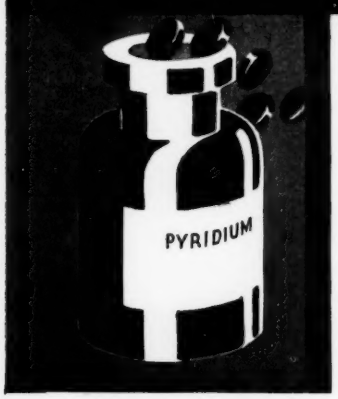
Dr. Herring Winship, Macon, aged 57, died December 30.

Dr. Don Quixote Dallas, Pavo, aged 61, died December 2.

Dr. Charles R. Andrews, Atlanta, aged 53, died December 24.

Continued on page 22

PYRIDIUM



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FOR URINARY INFECTIONS

The oral administration of Pyridium affords a prompt and convenient method of obtaining urinary antisepsis when treating gonorrhea and other genito-urinary infections. Pyridium penetrates denuded surfaces and mucous membranes and is eliminated through the urinary tract. In therapeutic doses, it is neither toxic nor irritating. Pyridium is supplied as tablets, powder, solution or ointment . . . . *Write for literature.*

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WHEN normal body functions give evidence of being interfered with; when symptoms are vague or debatable; or when the treatment of a disorder produces no beneficial effect, have radiographs made.

An obvious dysfunction or disease may easily divert attention from a remote, more serious condition. In such cases, the information which x-rays will give is invaluable. If there's a growth, they will reveal its presence—its position and extent. Many malignancies can be detected at such an early stage that removal is simplified and entirely successful.

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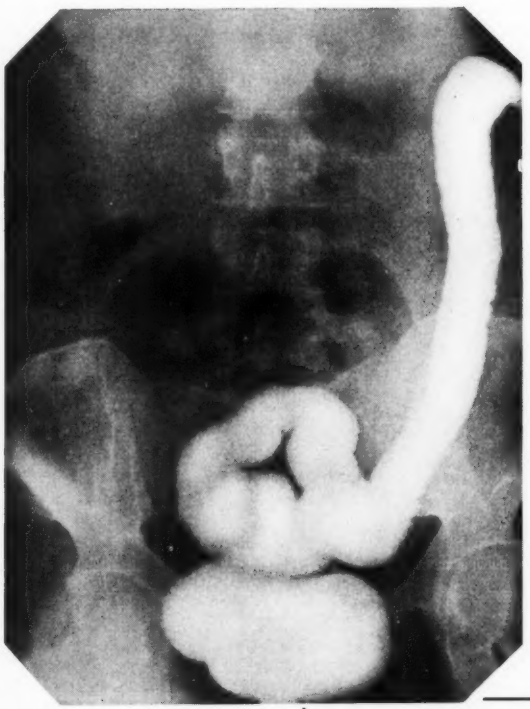
Whenever the clinical examination offers only *inconclusive findings*, refer the patient to your radiologist. His x-ray examination will provide indispensable facts to aid in your diagnosis.

Eastman X-ray Films have greatly widened the scope of radiography. They are so sensitive and have such latitude that detailed images may now be obtained of parts which formerly could not be radiographed.



Colicky pains in lower abdomen for five months. Patient had a uterine fibroid which was thought to be causing intestinal obstruction. Removal did not relieve obstruction, which became worse. Subsequently, an opaque enema radiograph revealed the cause to be carcinoma.

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Gentlemen: Please place my name on the free mailing list to receive "Radiography and Clinical Photography."

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Continued from page 20

KENTUCKY

The Jefferson County Medical Society has elected the following officers for 1933: Dr. I. T. Fugate, President; Dr. Lee Palmer, First Vice-President; Dr. Walter I. Hume, Second Vice-President; Dr. Charles M. Edelen, Secretary; and Dr. O. R. Reesor, Treasurer; all of Louisville.

The Madison County Medical Society has elected the following officers for 1933: Dr. J. D. Farris, President; Dr. John Blevins, Vice-President; and Dr. J. G. Bosley, Secretary-Treasurer; all of Richmond.

The Oldham County Medical Society has elected the following officers for 1933: Dr. H. B. Blaydes, LaGrange, President; and Dr. J. T. Walsh, Secretary.

The Fifth District Medical Society met at Carrollton recently and elected the following officers for the coming year: Dr. George Purdy, New Liberty, President; Dr. E. B. Smith, Shelbyville, Vice-President; and Dr. Owen Carroll, New Castle, Secretary.

The Berea College Hospital at Berea recently held dedication ceremonies for the new addition to the Hospital, which will be known as the Munger Memorial and the Charles T. Ballard, Jr., Clinic.

Dr. Robert K. Galloway, Henderson, is the newly elected President of the Green River Valley Public Health Association.

Dr. Charles F. Blankenship, Hawesville, has been made Health Officer of Grayson County to succeed Dr. Robert F. Porter, Leitchfield, resigned.

Dr. William H. Joyner, Greenup, and Mrs. Clista Mullins were married recently.

Dr. Eugene C. Hyden, Auxier, and Miss Mary Margaret Richer were married in December.

DEATHS

Dr. James Hughes Letcher, Henderson, aged 86, died December 6 as the result of an injury received in a fall.

Dr. Theodore Bachly Pearson, Nicholasville, aged 53, died December 12 of heart disease.

Dr. Thomas Edwin Craig, Louisville, aged 44, died suddenly December 26 of heart disease.

Dr. Arthur Wilbur Dawson, Owensboro, aged 57, died November 18.

Dr. Eliza Ellen Maples Morris, East Bernstadt, aged 70, died November 27 of cerebral hemorrhage.

Dr. Andrew William McCandless, Mount Vernon, aged 64, died December 16 of influenza.

Dr. John Fulton Alexander, Mount Aerial, aged 77, died December 20 of chronic myocarditis.

Dr. Robert Thomas Hocker, Arlington, aged 86, died December 20 of injuries received in a fall.

LOUISIANA

The Iberia Parish Medical Society has elected the following officers for the coming year: Dr. Guy A. Shaw, Loreauville, reelected President; and Dr. David Turest, New Iberia, elected Secretary-Treasurer.

Dr. Aldo Castellani, New Orleans, Professor of Tropical Medicine and Head of the Department, Louisiana State University Medical Center, was recently appointed Director-in-Chief of the Ross Institute and Hospital, London, to succeed Sir Ronald Ross, who died recently.

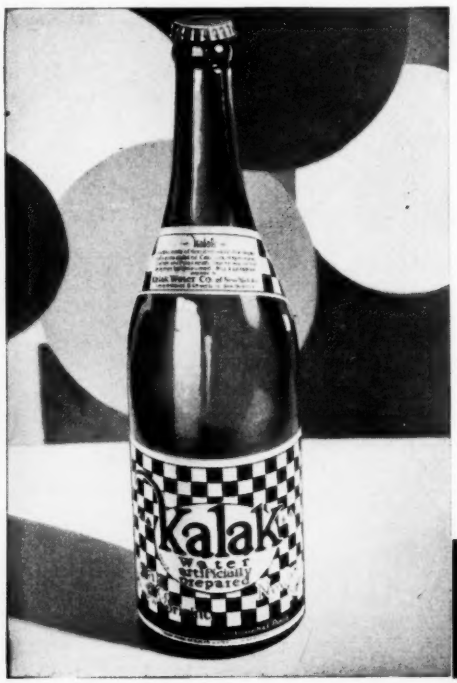
The French Hospital, New Orleans, has elected the following officers for 1933: Dr. H. B. Alsobrook, reelected Chairman of the Staff; Dr. Martin Miller, elected Vice-Chairman; Dr. N. J. Tessitore, Secretary; and Dr. Peter Graffagnino, reappointed Chairman of the Executive Committee.

Dr. Basil S. MacLean, New Orleans, Superintendent of the Touro Infirmary, has been honored by appointment on a small committee of the American Hospital Association to study medical cost and hospitalization plans.

Dr. E. McC. Connely, New Orleans, has been appointed consulting neurologist on the staff of the Marine Hospital, succeeding the late Dr. Henry Daspit.

Dr. Lionel S. Cazenavette, New Orleans, was recently appointed Superintendent of the City Hospital for Mental Dis-

Continued on page 24



NEUTRALIZATION AND ELIMINATION

The neutralization of acids and the dilution and elimination of toxins is recognized as important not only to the recovery but to the comfort of the patient.

The palatability of properly cooled Kalak is so appealing to the patient that the problem of proper alkali and fluid administration to combat an acid intoxication is solved for the physician.

KALAK WATER CO. of NEW YORK, Inc.
6 Church Street, New York City

Kalak
TRADE MARK REG U.S PAT OFF

NO CONFUSION HERE

Your Patient Gets Both "A" and "D" When You Prescribe Patch's Flavored Cod Liver Oil

"Cod Liver Oil contains vitamin A which is just as essential to normal growth and development as is vitamin D . . .

"Vitamin A can be satisfactorily stored in the body.

"It is the part of good therapy to build up a reserve of this vitamin for the protection it affords against respiratory infections during the season of greatest incidence of these conditions, and in those patients, children or adults, who show marked susceptibility to them."*

There is no doubt or confusion when you prescribe Patch's Flavored Cod Liver Oil.

Your patient gets both fat-soluble vitamins—A and D—in guaranteed potency, and benefits likewise from its high energy value.

First, note the guarantee of potency which makes every batch of Patch's uniform in vitamin strength.

Then send for a trial bottle so that you can test its acceptability —a Cod Liver Oil that your patients can take readily, without fuss or objection.

THE E. L. PATCH COMPANY

BOSTON, MASS.

*Intl. Jl. Med. & Surg., Oct. 1930, p. 545.

Guaranty of Potency

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PATCH'S

ACCEPTED AMERICAN MEDICAL ASSN.

The E. L. Patch Co.,
Stoneham 80, Dept. S.M.3,
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Gentlemen: Please send me a sample of Patch's Flavored Cod Liver Oil and literature.

Dr.....

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Continued from page 22

eases, this appointment also making him neurologic consultant and expert witness for the City of New Orleans.

Dr. Frederick L. Fenno, New Orleans, is the newly appointed Consulting Neurologist to the Eye, Ear, Nose and Throat Hospital.

Dr. Frank J. Chalaron, New Orleans, Head of the Department of Neurology of the Mercy Hospital, has been elected President of the Staff of the Hospital.

Dr. Hubert Pylant Clemmer, New Orleans, and Miss Pauline Merritt were married recently.

Deaths

Dr. Eugene Charles Thornhill, New Orleans, aged 51, died November 29.

Dr. Richard Eugene Oden, Kinder, aged 66, died December 9 of heart disease.

MARYLAND

Over 400 friends of Dr. Howard A. Kelly, Baltimore, gave him a testimonial dinner on his seventy-fifth birthday, February 20, at the Lord Baltimore Hotel. Dr. Kelly, now Emeritus Professor of Gynecology at Johns Hopkins, first chosen for the chair at the age of 28, was the youngest man ever to hold a full professorship in the Medical School. He did pioneer work in gynecology, urology, proctology and radium therapy, and has also been outstanding as a pathologist, biologist, biographer and medical author.

The late Dr. William Sydney Thayer, Baltimore, Professor Emeritus of Medicine at Johns Hopkins University School of Medicine, who died in December, willed his body to science and requested that a necropsy be performed as soon as possible after death. Dr. Thayer suggested that the circumstances of a complete anosmia which he had endured for some time might be of scientific interest.

Dr. Edward Nathaniel Brush, Baltimore, aged 80, died January 10 of pneumonia.

Dr. Austin A. Lamar, Middletown, aged 56, died December 11 of uremia and nephritis.

Dr. William Thomas Seabury, Baltimore, aged 53, died December 2 of heart disease and chronic nephritis.

MISSISSIPPI

The Central Medical Society has elected the following officers for 1933: Dr. John B. Howell, Canton, President; Dr. F. E. Rehfeldt, Hinds, Dr. R. W. Smith, Madison, Dr. W. H. Watson, Rankin, Dr. W. C. Anderson, Scott, Dr. J. L. Weimers, Simpson, Dr. Gilruth Darrington, Yazoo City, Vice-Presidents; and Dr. Robin Harris, Jackson, Secretary.

The DeSoto County Medical Society has elected the following officers for 1933: Dr. A. J. Weissinger, Hernando, President; Dr. J. M. Wright, Hernando, Vice-President; and Dr. L. L. Minor, reelected Secretary-Treasurer.

The East Mississippi Medical Society has elected the following officers for 1933: Dr. Dudley Stennis, Newton, President; Dr. T. G. Cleveland, Lauderdale, Dr. W. J. Pennington, Newton, Dr. W. R. Hand, Neshoba, Dr. E. L. Richardson, Winston, Vice-Presidents; and Dr. T. L. Bennett, Meridian, Secretary.

The Jackson County Medical Society has elected the following officers for 1933: Dr. S. B. McIlwain, Pascagoula, President; Dr. R. C. Eley, Moss Point, Vice-President; and Dr. J. F. Busey, Secretary-Treasurer.

The Kemper County Medical Society has elected the following officers for 1933: Dr. C. M. Gully, President; and Dr. V. M. Creekmore, Secretary; both of DeKalb.

The following Holmes County physicians have been elected officers of the newly organized Staff of the Holmes County Community Hospital: Dr. R. M. Stephenson, Lexington, Chairman; and Dr. C. H. Ingram, Pickens, Secretary.

Dr. M. L. Flynt, formerly of Newton, where he was Physician-in-Charge of the Newton Infirmary, has opened offices in the Meridian Medical and Surgical Clinic. Dr. Flynt will be Visiting Surgeon to the Newton Infirmary, while Dr. O. Simmons and Dr. D. N. Stennis, Newton, will continue to have their offices in the Infirmary and will carry on the medical and surgical services.

Dr. J. E. Ellis, West Point, is taking a four months' postgraduate course in New Orleans.

Dr. L. L. McDougal, Jackson, is taking postgraduate work in New Orleans, having been awarded a fellowship under the Commonwealth Fund plan.

Continued on page 26

GILLILAND

Tetanus Antitoxin

(Ultra-Concentrated)

Small-Pox Vaccine **Diphtheria Toxoid**

Typhoid Vaccine **Toxin-Antitoxin**

Scarlet Fever Antitoxin

(Prophylactic and Therapeutic Pkgs.)

Complete list of products sent on request

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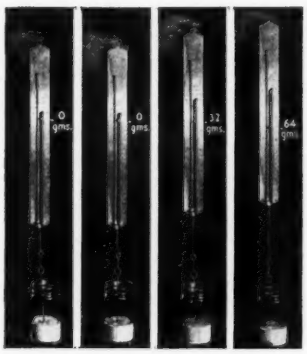
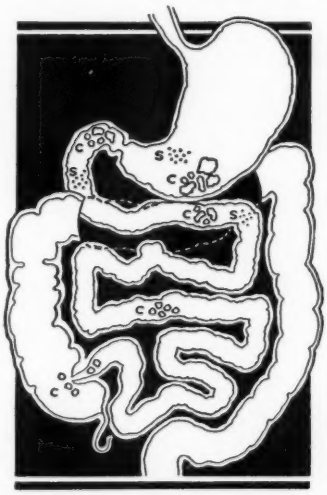
– AND INFANT FEEDING –

ITS · EFFECT · UPON · THE · ASSIMILATION · OF

PROTEINS



BREAST MILK | SIMILAC POWDERED MILK | COW'S MILK



C—Cow's milk S—Similac
Schematic drawing of the relative size of the curds of cow's milk and Similac vomited by six weeks old puppies after one-half hour's ingestion.

"THE most available and the most easily digestible form of protein for infants is the protein of milk. The protein of breast milk is more digestible than that of cow's milk."

"In the light of our present knowledge, the chief cause of the difference in the digestibility of the protein of human milk and that of cow's milk lies in the greater proportion of casein in cow's milk."

"It is the formation of large curds which renders the casein of cow's milk so much more difficult of digestion by the infant than that of human milk. If the formation of large casein curds in the stomach can be prevented, the casein of cow's milk is easily digested." [1]

In SIMILAC the large casein curds are not formed. The curds formed when the gastric enzymes act upon SIMILAC are small and flocculent, registering zero on the tensiometer, as shown in the illustration, hence more easily digested.

The finer the curd the greater the surface area. The greater the surface area the more exposed are the fats, carbohydrates, proteins and salts to the digestive enzymes. Result . . . a more complete utilization of the food elements.

[1] Morse and Talbott, Diseases of Nutrition and Infant Feeding, pgs. 214, 215.

Samples and literature will be sent on receipt of your prescription blank.

SIMILAC—Made from fresh skim milk (casein modified); with added lactose, salts, milk fat and vegetable and cod liver oils.

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BACILLUS ACIDOPHILUS CULTURE
(B. A. CULTURE)

appeals at once to physicians who employ the Bacillus Acidophilus. Its convenient form, ease of administration, effectiveness and reasonable price have made many friends.

B. A. CULTURE is available in 4-ounce bottles at your druggist's. Of course, we will gladly furnish samples for clinical trial.

B. B. Culture Laboratory, Inc.
Yonkers, New York
(Producers of lactic cultures since 1910.)

Continued from page 24

Dr. Henry Maxwell Smith, Natchez, and Miss Matty L. Rife were married recently.

DEATHS

Dr. Thomas Jefferson Crofford, Jr., Jackson, aged 48, died December 15 of carcinoma of the stomach.

Dr. John McCallum McInnis, Brooklyn, aged 64, died November 22 of cerebral hemorrhage.

Dr. Prentiss A. Carter, Hattiesburg, aged 61, died December 2 of chronic nephritis.

Dr. John E. Quidor, Vicksburg, aged 53, died January 5 of portal cirrhosis and esophageal hemorrhage.

MISSOURI

The Audrain County Medical Society has elected the following officers for 1933: Dr. R. S. Williams, President; Dr. J. Frank Jolly, Vice-President; and Dr. H. C. Brashear, Secretary and Treasurer; all of Mexico.

The Cape Girardeau County Medical Society has elected the following officers for 1933: Dr. M. H. Shelby, Cape Girardeau, President; Dr. Sylvester Doggett, Cape Girardeau, Vice-President; Dr. C. A. W. Zimmermann, Cape Girardeau, Secretary; and Dr. B. W. Hays, Jackson, Treasurer.

The Clay County Medical Society has elected the following officers for 1933: Dr. R. E. Sevier, Liberty, President; Dr. C. H. Suddarth, Excelsior Springs, Vice-President; and Dr. J. J. Gaines, Excelsior Springs, reelected Secretary-Treasurer.

The Nodaway County Medical Society has elected the following officers for 1933: Dr. Robert C. Person, Maryville, President; Dr. Charles W. Kirk, Hopkins, Vice-President; and Dr. Charles D. Humberd, Banard, Secretary-Treasurer.

The Randolph-Monroe County Medical Society has elected the following officers for 1933: Dr. P. C. Davis, Moberly, President; Dr. M. C. McMurry, Paris, Vice-President; and Dr. F. L. McCormick, Moberly, Secretary-Treasurer.

Dr. Vilray P. Blair, St. Louis, has been elected President of the Southern Surgical Association for the coming year.

Continued on page 28

EURESOL

For the Scalp and Skin

Euresol, resorcinolmonoacetate, is used in lotions and salves, in acne, eczematous conditions, and particularly in diseases of the scalp, itching, dandruff and falling hair. *Council Accepted*

Write for formulae and sample

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From the selection of the tuberculin-tested herds, through the choice of pasturage and the conditions under which the cows are housed and tended, on through the actual milking and delivery of the milk to the Klim plants—all is scientifically guarded to assure absolute purity. Furthermore, the milk is pasteurized before dehydration, so that the resulting product compares with certified milk in its freedom from bacteria.

Only milk produced under these carefully supervised sanitary regulations could earn the confidence of the medical profession—only such milk could give Klim its 30-year record of continuous and growing use by physicians.

To the primary factor of utter safety and unvarying uniformity are added superior digestibility, high nutritive properties, and convenience.

May we send you samples of Klim — the standard powdered whole milk — to try out in your practise?

The Borden Company, Dept. KM 18, 350 Madison Avenue, New York, N. Y.

KLIM

POWDERED WHOLE MILK

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HORLICK'S the Original MALTED MILK

OVERWEIGHT—Horlick's, wisely used, is sustaining in a reducing program. It affords a light luncheon in place of a heavy meal.

UNDERWEIGHT—Added to the regular meals, it is a valuable building food for the undernourished.

Samples upon request

HORLICK'S ACCEPTED AMERICAN MEDICAL ASSN Racine, Wis.

Continued from page 26

The Hodgen Lecture, given annually under the auspices of the St. Louis Surgical Society and the Medical Fund Society, was delivered this year by Dr. Frank C. Mann, of the Mayo Foundation for Medical Education and Research, University of Minnesota, Rochester.

The St. Louis Urological Society has elected the following officers for 1933: Dr. J. Hoy Sanford, President; Dr. C. E. Burford, Vice-President; and Dr. J. F. Patton, Secretary-Treasurer; all of St. Louis.

The following Kansas City physicians have been elected officers of the Staff of the St. Joseph's Hospital, Kansas City: Dr. C. Edgar Virden, President of Staff; Dr. T. J. Beattie, Chief of Staff; Dr. Harry L. Jones, Vice-President; Dr. C. S. Capell, Treasurer; and Dr. Frank B. Wallace, Secretary.

Dr. Llewellyn Sale, St. Louis, is the newly elected President of the Missouri Social Hygiene Association.

The Mississippi Valley Dermatological Society held its meeting in Kansas City in January.

The following St. Louis physicians have been elected to the Board of Directors of the St. Louis Society for the Blind: Dr. J. F. Hardesty, Dr. John Green, Dr. H. J. Howard, Dr. H. D. Lamb, Dr. W. H. Luedde, Dr. Lawrence T. Post, and Dr. Fred Reinbeck.

The Medical Association of the Missouri Pacific Railroad met in Kansas City in January for its fourth annual session.

Dr. Herbert J. Rinkel, formerly of Oklahoma City, Oklahoma, has moved to Kansas City, where he has opened offices at 927 Argyle Building, being associated with Dr. Orval R. Withers.

Dr. Patrick H. Owens, Kansas City, was recently elected coroner of Jackson County.

Dr. Harvey J. Howard, St. Louis, recently resigned the Professorship of Ophthalmology in the School of Medicine, Washington University, in order to open a private office in the Park Plaza Hotel, Kingshighway and Maryland Avenue.

The following St. Joseph physicians have been elected officers of the Staff of the Missouri Methodist Hospital: Dr. H. S. Conrad, Chairman of the Staff; Dr. A. B. McGlothlan, Vice-Chairman; and Dr. Earl Senor, Secretary.

Continued on page 30

ORGANOTHERAPY

can be effective only through the use of dependable endocrine products. The reputation and integrity of the manufacturer is the physician's only guarantee of reliability of those organotherapeutic products for which there is no chemical or biological assay. Every manufacturing process of all our products is supervised by our Analytical and Research Department.

DESICCATED PITUITARY BODY, U.S.P.
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CORPUS LUTEUM AMPULES
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THE SOLUTION OF A CENTURY-OLD PROBLEM . . .

The Prevention and Cure of Rickets

through

IRRADIATED MILK

EDITORIAL: "Irradiated Milk"

Jour. Amer. Med. Assoc., Nov. 26, 1932

"Milk is of particular interest because of its unrivaled content of calcium and phosphorus—the adjuvants of a properly planned antirachitic regimen. It is gratifying to learn through the recent communication of A. F. Hess and his co-workers that fluid milk can now be successfully activated at almost insignificant cost, that it retains its antirachitic potency after drying, and that both the fluid and the dry products have been extensively tested on children with satisfactory outcome."

Dryco is the Only Irradiated Dry Milk Product!

The same Dryco which has been successfully prescribed over a period of 16 years *plus an increased vitamin D factor.*

PRESCRIBE

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DRYCO

Made from superior quality milk from which part of the butterfat has been removed, irradiated by the ultraviolet ray, under license by the Wisconsin Alumni Research Foundation, (U. S. Patent No. 1,680,818) and then dried by the "Just" Roller Process.

THE DRY MILK CO., Inc., Dept. SM, 205 East 42nd St., New York, N. Y.

All Dryco in the Hands of Druggists is Irradiated

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Dry Milk Company, Inc., Dept. SM,
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Please send special literature: Dryco—The Irradiated Milk; Irradiated Milk in the Treatment of Rickets; Milk Irradiated by the Carbon Arc Lamp (Abs.); The Prevention and Cure of Rickets Through Irradiated Milk—A Public Health Measure.

Continued from page 28

NORTH CAROLINA

Dr. Julian W. Ashby, Raleigh, Assistant Superintendent of Central State Hospital for the Insane, has succeeded Dr. Albert Anderson, deceased, as Superintendent.

Dr. P. P. McCain, Sanatorium, addressed a recent meeting of the Seaboard Medical Association at Rocky Mount.

DEATHS

Dr. William A. Graham, Hayesville, aged 77, died November 26 of cerebral hemorrhage.

Dr. Charles Lee Jenkins, Caledonia Farm, aged 67, died November 4 of angina pectoris.

Dr. George W. Norman, Jamestown, died January 7.

OKLAHOMA

Dr. Herbert J. Rinkel, formerly of Oklahoma City, has moved to Kansas City, Missouri, where he is located at 927 Argyle Building.

DEATHS

Dr. William Harry Smedley, Capron, aged 69, died suddenly December 16 of angina pectoris.

Dr. John Manley Reid, Blackwell, aged 85, died September 1.

Dr. Albert Sidney Riddle, Stillwater, aged 70, died November 29 of heart disease.

Dr. Gayfree Ellison, Norman, aged 57, died December 22.

Dr. Daniel William White, Tulsa, aged 51, died October 31.

SOUTH CAROLINA

Dr. and Mrs. John H. Cathcart, Gaffney, recently entertained physicians of Cherokee County, when they met for the reorganization of the Cherokee County Medical Society.

The "MESCO" Laboratories manufacture the largest line of Ointments in the world. Sixty different kinds. We are originators of the Professional Package. Specify "MESCO" when prescribing ointments. Send for lists.

Manhattan Eye Salve Co.

LOUISVILLE, KENTUCKY

Classified Advertisements

HOME FOR CONVALESCENTS—In Blue Grass section; guests received in well appointed home. Tired business executives, lonely shut-ins, slow convalescents and frail elderly persons receive personal care. Moderately priced. Endorsed by Franklin County Medical Association. Mrs. C. Montgomery, 507 West 2nd Street, Frankfort, Kentucky. Telephone 366.

ASSISTANCE OFFERED TO MEDICAL WRITERS. Research. Abstracts. Translations (all languages). Papers prepared from author's data. Ten years' experience with leading physicians and appointments on medical journals of highest standing. I employ no assistants; all my work is done personally and is reliable. Florence Annan Carpenter, 413 St. James Place, Chicago, Ill.

DRUG AND ALCOHOL PATIENTS are humanely and successfully treated in Glenwood Park Sanitarium, Greensboro, N. C.; reprints of articles mailed upon request. Address W. C. Ashworth, M.D., Owner, Greensboro, N. C.

The South Carolina Urological Association has elected the following officers for the coming year: Dr. James D. Whaley, Charleston, President; and Dr. Paul W. Sanders, Jr., Charleston, Secretary.

Dr. S. H. Haddock, formerly of Millen and Augusta, Georgia, has opened offices in Anderson at 10 East Earle Street, practice to be limited to pediatrics.

The Tri-State Medical Association of the Carolinas and Virginia held its annual meeting in Greenville, South Carolina, in February.

Dr. Theodore Jervey Hopkins and Miss Jane Calvert McDowell, both of Columbia, were married recently.

Dr. James Lawrence Bolt, Easley, and Miss Anne Swain were married recently.

TENNESSEE

The Benton, Carroll, Henry, Weakley Counties Medical Society has elected the following officers for the coming year: Dr. W. Gardner Rhea, Paris, President; Dr. A. F. Paschall, Puryear (Henry County), Dr. G. C. Thomas, Greenfield (Weakley County), Dr. R. A. Douglas, Huntington (Carroll County), Vice-Presidents; and Dr. George D. Boone, Paris, Secretary-Treasurer.

The Hardin, Lawrence, Lewis, Perry and Wayne Counties Medical Society has elected the following officers for the coming year: Dr. F. H. Norman, Waynesboro, President; and Dr. C. C. Stockard, Lawrenceburg, Secretary-Treasurer.

The Middle Tennessee Medical Society held its seventy-sixth semi-annual meeting at Columbia in November and elected the following officers for the coming year: Dr. L. D. Allen, Smithville, President; Dr. C. F. Anderson, Nashville, Vice-President; and Dr. Theo Morford, Nashville, reelected Secretary.

Dr. E. C. Anderson, Chattanooga, has moved into new offices at 414 McCallie Avenue.

Dr. O. C. Mayberry, Knoxville, has moved into new offices in the Medical Arts Building.

Dr. D. J. Zimmerman has opened an office at White Pine.

Dr. Ellis J. Huey has located at Martin, with offices in the P. and G. Drug Store.

Dr. O. E. Ballou, formerly of White Pine, has moved to Clinton.

Dr. Thomas D. Moore, Memphis, has moved into new offices at 1032 Madison Avenue, practice limited to urology.

Dr. Charles F. Clayton has located at Knoxville with offices in the Medical Building, moving there from Bell County, Kentucky.

Dr. William Edgar Van Order and Miss Henrietta Caulkins, both of Chattanooga, were married in November.

DEATHS

Dr. John Owen Kirkpatrick, Nashville, aged 85, died November 23 of arteriosclerosis.

Dr. William Thomas Porter, Jackson, aged 82, died November 28 of nephritis.

TEXAS

Dr. John W. Brown, Marfa, has succeeded Dr. James C. Anderson as State Health Officer.

Dr. James W. Bass, Dallas, is the newly elected President of the Texas Public Health Association, having been chosen for that office at the recent annual meeting in Dallas.

Dr. John T. Harrington, Waco, is the newly elected President of the Board of Trustees of Baylor University.

Dr. Thomas C. Lynch, Wichita Falls, has been named Health Officer of Wichita County.

Dr. Clifford G. Engle and Miss Lucile Crim, both of Henderson, were married in November.

DEATHS

Dr. Leo Alonzo Berrey, Corpus Christi, aged 49, died December 14 of cerebral hemorrhage.

Dr. Albert G. Krueger, Caldwell, aged 63, died December 5 of influenza and pneumonia.

Dr. William Argyle Garrett, Houston, aged 73, died December 15 of heart disease.

Dr. Preston C. Coleman, Colorado, aged 79, died October 29.

VIRGINIA

Dr. Fred M. Hodges, Richmond, has been appointed General Chairman for the Southern Medical Association meeting to be

Continued on page 32

Leadership

THAT CANNOT BE DENIED

When White's Cod Liver Oil Concentrate Tablets Were Put On The Market As One Of The First Concentrates They Assumed A Leadership In The Vitamin Field That Cannot Be Denied.

To Perfect a Vitamin A and D Concentrate—showing definite uniformity of vitamin potency by repeated assays on old and new batches—

To put it in a tablet—

To make the tablet so palatable that adults and children would accept it like candy—

To keep improving it without increasing the cost to the patient—

To keep its dosage in conformity with modern therapeutic knowledge—

To keep the effectiveness in vitamin deficiencies constantly checked by clinical studies—

To secure its acceptance by leading medical, dental and food research authorities—

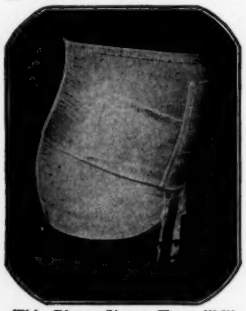
All of these things have been accomplished. White's Cod Liver Oil Concentrate Tablets are today a leader in their field. We venture to believe they will continue so.

HEALTH PRODUCTS CORPORATION

Newark, N. J.

Trademark Registered **STORM** Trademark Registered

Binder and Abdominal Supporter



Gives perfect uplift and is worn with comfort. Made of Cotton, Linen or Silk, washable as underwear.

Three distinct types of Storm Supporters — many variations of each type.

This Photo Shows Type "N"

STORM supporters are made for all conditions needing abdominal uplift. Ptosis, Hernia, Pregnancy, Obesity, Relaxed Sacro-Iliac, Articulations, Kidney Conditions, Post-Operative Support, etc.

Each Belt Made to Order **Ask for Literature**

KATHERINE L. STORM, M. D.
Originator, Owner and Maker
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PURITAN MAID TRADE MARK REG.

OXYGEN— The Life Saver

Preoperatively, postoperatively, in chronic heart conditions, in pneumonias, is coming into real therapeutic use and value. We have all kinds of outfits for rentals and sales.

Write for Circulars

1. Why Use Gases as Anesthetics and Resuscitants?
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3. Descriptive Matter on Oxygen Tents and Portable Rooms.
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Puritan Compressed Gas Corp.

Kansas City, Mo. 2012 Grand Ave. **Cambridge, Mass.** 13 Charles St. **Chicago, Ill.** 1660 So. Ogden Ave.
Baltimore, Md. Race and McComas Sts. **Cincinnati, Ohio** 6th & Baymiller Sts. **Detroit, Mich.** 455 Canfield Ave., E.
St. Paul, Minn. 810 Cromwell Ave. **St. Louis, Mo.** 4378 Laclede Ave.

Continued from page 30

held in Richmond in November, the appointment having been recently announced by the President of the Richmond Academy of Medicine, Dr. Carrington Williams.

The Southside Virginia Medical Association has elected the following officers for the coming year: Dr. D. C. Mayes, Church Road, President; Dr. Leta J. White, Petersburg, Dr. F. N. Mallory, Lawrenceville, Dr. J. Lewis Rawls, Suffolk, Dr. Joel Crawford, Yale, Vice-Presidents; and Dr. R. L. Raiford, Franklin, reelected Secretary-Treasurer.

Dr. Paul J. Parker, Hampton, has been named to succeed the late Dr. George K. Vanderslice as Coroner of Elizabeth City County.

Dr. J. L. Tabb, Richmond, associate of the late Dr. A. L. Gray, announces the continuation of his practice of roentgenology at their former office in the Medical Arts Building.

Dr. Mason Romaine, Petersburg, has resumed his duties as City Health Officer after some time spent in Europe.

Dr. Karl Blackwell, Richmond, is the newly elected President of the local alumni chapter of the Kappa Alpha fraternity.

Dr. A. Stephens Graham has located in Richmond with offices in the Medical Arts Building for the practice of surgery and surgical diagnosis. Dr. Graham has also been appointed Visiting Surgeon to Stuart Circle Hospital.

The Gill Memorial Eye, Ear and Throat Hospital, Roanoke, announces its seventh annual Spring Graduate Course to be held in April.

Dr. Andrew D. Parson, formerly of Raven, is taking postgraduate work at Tulane University, New Orleans, after the completion of which he will be located in Richlands.

The Southwestern State Hospital, Marion, announces the completion of a new unit costing $100,000, which will accommodate 100 additional patients.

Dr. Paige E. Thornhill has located in Norfolk with offices in the Wainwright Building, coming there from Watertown, New York.

Dr. Charles W. Tucker, Drakes Branch, is the newly elected Chairman of the Charlotte County Board of Supervisors.

Dr. Mary E. Roche, Norfolk, has moved her offices from the Medical Arts Building to 910 Wainwright Building.

Dr. Brewster Arthur Hopkins, formerly on the Staff of the Central State Hospital, Petersburg, has moved to Stuart, where he will engage in general practice.

Dr. R. L. Payne, Norfolk, was reelected Secretary of the Southern Surgical Society at their recent meeting.

Dr. David Lemuel Harrell, Jr., and Miss Katie Mae Moore, Lynchburg, were married in January.

Deaths

Dr. Carter Weisiger, Cumberland, aged 58, died December 30.

Dr. Henry Clary Beckett, Chase City, aged 81, died January 11.

Dr. Charles Mason Smith, Fredericksburg, aged 51, died suddenly January 2.

Dr. Martin L. Dalton, Montvale, aged 56, died January 2 of bronchopneumonia following influenza.

Dr. Ferdinand Mitchell Perrow, Lynchburg, aged 58, died January 19.

WEST VIRGINIA

The Fayette County Medical Society has elected the following officers for the coming year: Dr. William Price Bittinger, Summerlee, President; Dr. F. S. Harkleroad, Harvey, First Vice-President; Dr. E. E. Jones, Mount Hope, Second Vice-President; and Dr. Gilbert Daniel, Beards Fork, Secretary-Treasurer.

The Marshall County Medical Society reelected their officers for the coming year as follows: Dr. Oliver Perry Wilson, Moundsville, President; Dr. S. F. Yoho, Franks, Vice-President; and Dr. J. A. Striebich, Moundsville, Secretary-Treasurer.

The Summers County Medical Society has elected the following officers for 1933: Dr. W. L. VanSant, Hinton, President; and Dr. A. P. Hudgins, Hinton, reelected Secretary-Treasurer.

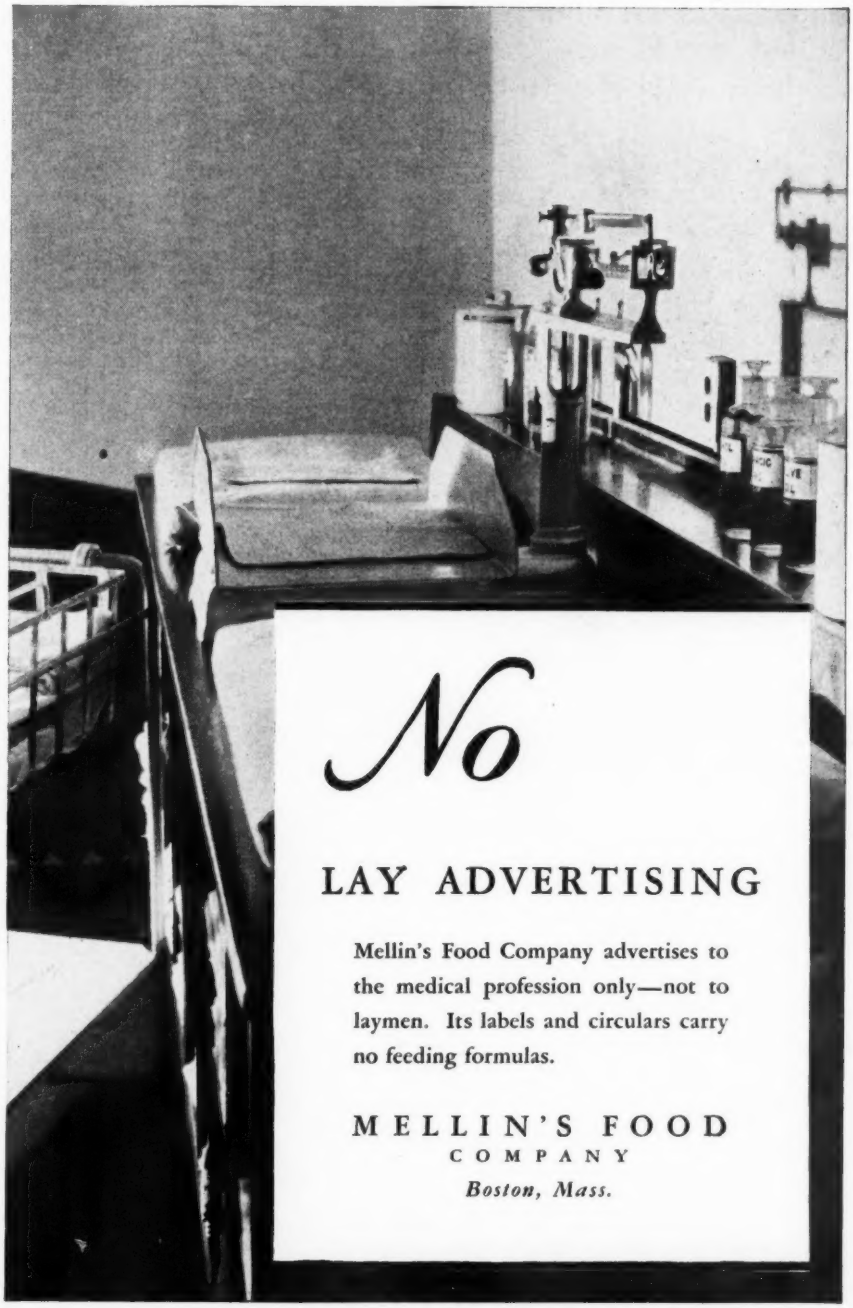
The Central West Virginia Medical Society has elected the following officers for the coming year: Dr. J. B. Dodrill, Webster Springs, President; Dr. L. W. Deeds, Buckhannon, Vice-President; and Dr. C. C. Carson, Gassaway, Secretary-Treasurer.

Dr. Curtis G. Power has located at Martinsburg with offices in the Reliance Life Building.

Dr. Clarence B. Schoolfield, Carbon, and Miss Mary Louise Secrist were married recently.

Deaths

Dr. S. J. Ross, Schultz, aged 80, died November 9 of cerebral hemorrhage and arteriosclerosis.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Mellin's Food Company advertises to the medical profession only—not to laymen. Its labels and circulars carry no feeding formulas.
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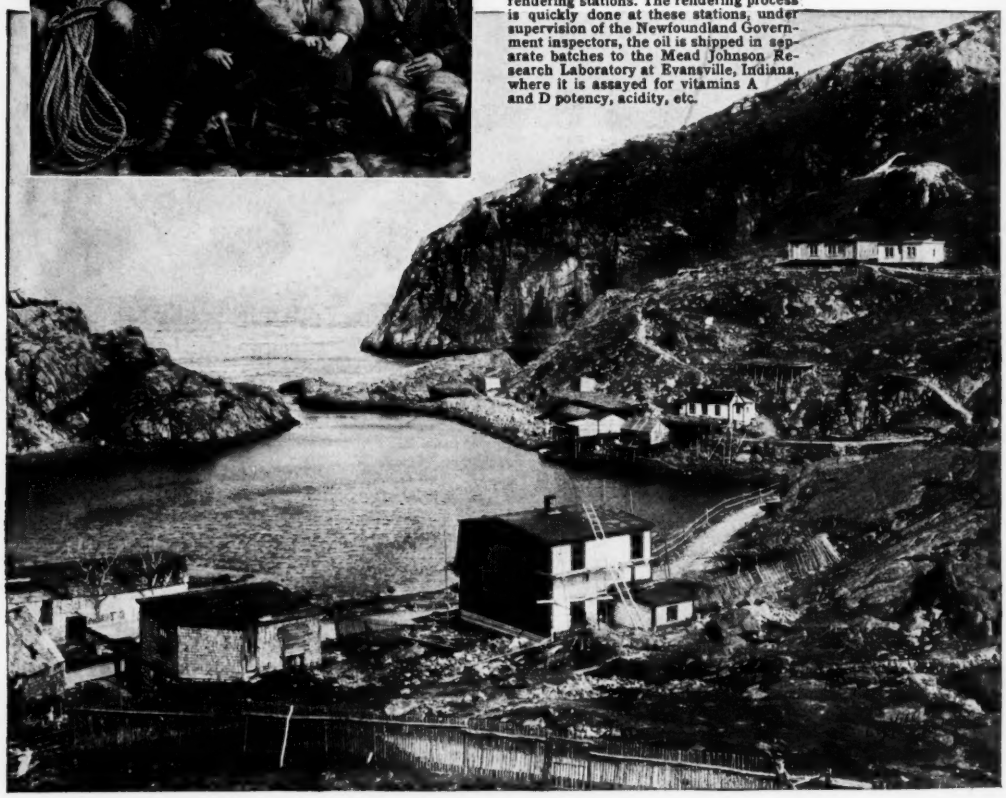
MEAD'S 10 D COD LIVER OIL WITH VIOSTEROL

is made from ergosterol prepared in our own laboratory from yeast cultured according to our own specification, activated by our own designed lamps and our own technic of activation, and added to Mead's Newfoundland Cod Liver Oil, and is the vehicle of choice (for vitamins A and D prophylaxis) of a large number of physicians who feel bewildered by the increasing number of vitamins A-D products on the market. For curative purposes, and for prophylaxis in severe rickets, their preference is Mead's Viosterol in Oil 250 D or Mead's Viosterol in Halibut Liver Oil 250 D. Mead Johnson and Company, Evansville, Indiana, U.S.A., Pioneers in Vitamin Research. Send for free Comparative Dosage Chart.

(1) TYPICAL NEWFOUNDLAND COD FISHERMEN

They catch the fish in traps and quickly land their catch alive at the Mead Johnson rendering stations. The rendering process is quickly done at these stations, under supervision of the Newfoundland Government inspectors, the oil is shipped in separate batches to the Mead Johnson Research Laboratory at Evansville, Indiana, where it is assayed for vitamins A and D potency, acidity, etc.



(2) A BIT OF RUGGED NEWFOUNDLAND SCENERY

near the harbor of St. John's, the center of the cod fishing industry. The cod liver oil used by Mead Johnson & Company originates exclusively at Newfoundland. Professors Drummond and Hilditch, in their tests of natural, untreated oils from the livers of cod fish have found Newfoundland Cod Liver Oil superior in Vitamins A and D content to cod liver oils from Iceland, Scotland and Norway.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons

Dextri-Maltose, the Carbohydrate of Choice

DEXTRI-MALTOSE NO. 1
COMPOSITION, DRY

Dextrins	42%
Maltose	51
Sodium Chloride	2
Moisture	5

When added to diluted cow's milk or diluted evaporated milk, the following percentages of carbohydrates result in practice, due to the large lactose content of cow's milk:

CARBOHYDRATES AS FED
IN A DEXTRI-MALTOSE FORMULA

	Percent of total carbohydrates
Dextrins	30%
Maltose	33
Lactose	37

THE question of carbohydrate additions to the infant's formula is an important one. Clinical experience has shown that cow's milk formulæ reinforced with lactose (commercial milk sugar) are not so well tolerated and do not give so satisfactory results as those reinforced with a carbohydrate composed of equal parts of maltose and dextrins.

No doubt this is due to the fact that the fat, protein and salts of cow's milk do not form a natural environment for such a high percentage of lactose, which requires more digestive energy than maltose and has a lower assimilation limit.

THE CHARACTERISTICS OF AVAILABLE SUGARS

The assimilation limits which have been generally accepted by authorities as correct are those reported by Reuss and Grosz, as follows:

Maltose (malt sugar) — 7.7 grams per kilogram of infant body weight. (Reuss.)

Lactose (milk sugar)—3.1-3.6 grams per kilogram of infant body weight. (Grosz.)

Saccharose (cane sugar)— Probably the same as lactose. (Reuss.)

Milk sugar and *cane sugar* are complex in structure, require considerable digestive energy, are slowly absorbed and have a low assimilation limit. They tend to proceed too low and remain too long in the intestinal tract, where they are subject to excessive bacterial fermentation.

Mead's Dextri-Maltose No. 1

For two decades, the pediatrician's choice for modifying cow's milk, because of its consistent clinical results, its ethical character, and because it embodies the fundamental principle of the flexible formula adapted to the individual baby's requirements.

The reasons for the desirability of Mead's Dextri-Maltose in infant feeding in preference to milk or cane sugar have recently been charted in very convincing form. Of the monosaccharides, dextrose, the end product of maltose, is converted into glycogen more easily than levulose or galactose. Therefore, maltose, which splits into two molecules of dextrose, may be absorbed with much less digestive energy than either lactose or saccharose, which split respectively into dextrose + galactose and dextrose + levulose.

Maltose—Maltose is simple in structure, being converted with a minimum of digestive energy by the enzyme, maltase, into the normal blood sugar (dextrose) which is immediately absorbed high in the intestinal tract.

Dextrins—The dextrins, more complex in structure than maltose, are converted more slowly into dextrose. However, the dextrins are not fermentable. They are first converted by the enzyme, amylopsin, into maltose, which though fermentable, is rapidly converted into the blood sugar, dextrose, which is quickly absorbed. An adequate amount of dextrins in the carbohydrate content of an infant's formula is desirable on account of their prolonged time of absorption. By virtue of this property, they protect the mucous membrane, prevent too rapid absorption of sugar, with a consequent rise in the blood sugar level, and assist in maintaining a normal intestinal flora.

NORMAL CARBOHYDRATE IN AN INFANT'S FORMULA

In a cow's milk dilution to which a proper amount of maltose and dextrins (Dextri-Maltose) has been added, the average percentages of the total carbohydrates present are as follows:

Dextrins	30%
Maltose	33
Lactose	37

These three carbohydrates differ in their conversion and absorption rates. Absorption and assimilation of the end products (dextrose, galactose) are, therefore, constant and gradual. Danger of flooding the system with sugar is avoided. With such a well-balanced formula, sufficient fermentable sugar is present in the intestines to maintain a normal intestinal flora and yet insufficient to create an abnormal condition favorable to diarrhea.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons.

Mead Johnson & Co. Pioneers in Vitamin Research *and* Specialists in Infant Diet Materials **Evansville, Ind., U.S.A.**

Dextri-Maltose No. 1 (with 2% sodium chloride), for normal babies. Dextri-Maltose No. 2 (plain, salt free), for salt modifications by the physician. Dextri-Maltose No. 3 (with 3% potassium bicarbonate), for constipated babies. "Dextri-Maltose With Vitamin B" is now available for its appetite-and-growth-stimulating properties. Samples on request. For the convenience of physicians who use lactic acid milk, there is available Mead's Powdered Lactic Acid Milk No. 1 which contains Dextri-Maltose.

One of a series of advertisements prepared and published by PARKE, DAVIS & COMPANY in behalf of the medical profession. This "See Your Doctor" campaign is running in the *Saturday Evening Post* and other leading magazines.

THIS LITTLE GIRL HAS THREE PARENTS

YES, this little girl has three parents. The third parent is the family physician.

He was a part of the family even before she was. He has stood beside her since her tiny lungs let loose their first wail of protest against a new and frighteningly large world. He knows her physical history. If there are weaknesses he is aware of them and able to keep a watchful eye on them.

Through her babyhood an affectionate understanding has been growing up between them. When she's ill, this man who comes to help her is not a stranger, but a friend in whom she has complete trust. He knows her little whims and how to get around them. She knows him and is at ease with him. She's a lucky little girl—with this third parent to watch over her, to care for her, to help her through the years that lie ahead.

Your family may not have a regular physician. Perhaps it's because you live in a large city, perhaps it's because you've moved recently and so are out of touch with your former doctor. Whatever the reason, if you do not now have a family doctor, get one. Do it now—do not let the health you enjoy today make you careless in providing this vital safeguard against the sickness tomorrow may bring. Find and become acquainted with the person to whom you can entrust the medical welfare of your family through the years to come.

PARKE, DAVIS & COMPANY, DETROIT, MICH., *The World's Largest Makers of Pharmaceutical and Biological Products*